HISTORICAL DIVER

The Official Publication of The Historical Diving Societies of
South East Asia Pacific, Canada, Germany, Mexico, Russia and the U.S.A.

Volume 10 Issue 4 **Fall 2002 No. 33**

40 Years Ago — The Hannes Keller 1,000 foot dive

• A History of Kirby Morgan — Part II • W. Leiter Hockett • Philippe Tailliez •

• Clifford Double Helmet • Northill Regulator • In Memory — Jiggs Jackson •

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HISTORICAL DIVING SOCIETY U.S.A.

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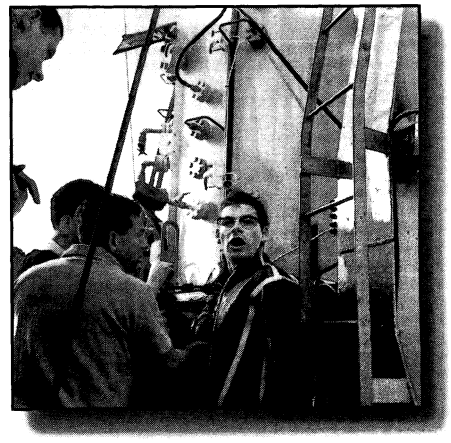
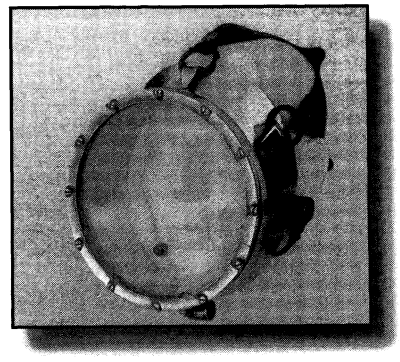
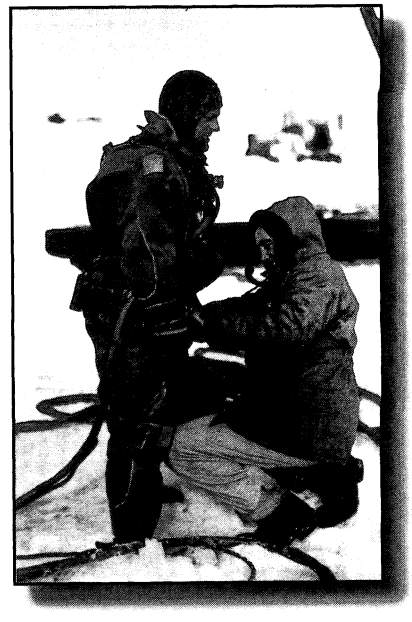
HISTORICAL DIVER

Volume 10, Issue 4 ISSN 1094-4516 Fall 2002, No. 33

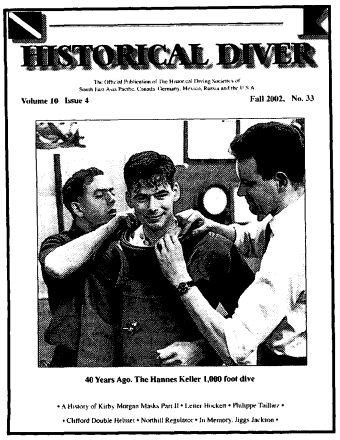
FEATURES







ON THE COVER



1962: Swiss mathematician Hannes Keller prepares to enter the wet diving tank at Naval Weapons Plant in Washington D.C. for a simulated dive to 700 feet. U.S. Navy photograph

Other Features

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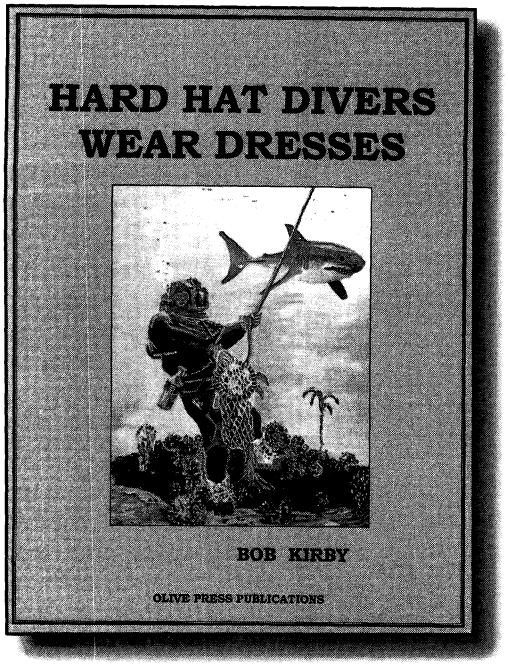
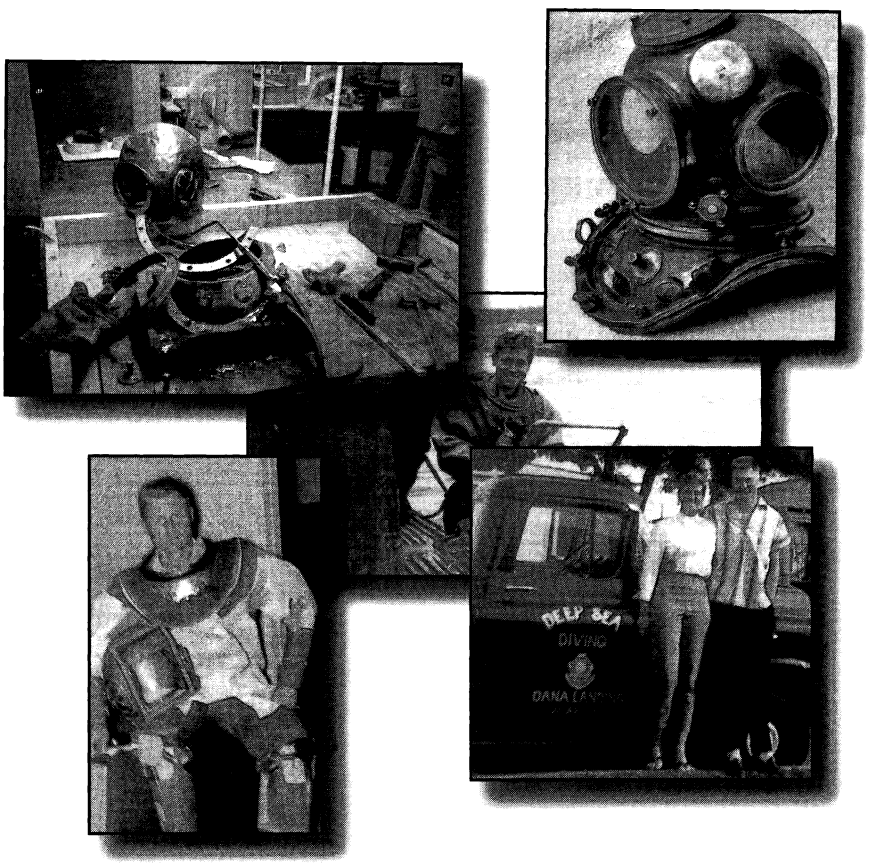
Diving is a potentially hazardous practice and if practiced incorrectly, or with incomplete planning and procedures, can expose a person to considerable risks including serious injury or death. It requires specialized training, equipment and experience. HISTORICAL DIVER is not intended as a substitute for the above or for the diver to abandon common sense in pursuit of diving activities beyond his or her abilities. HISTORICAL DIVER is intended as a source of information on various aspects of diving, not as a substitute for proper training and experience. For training in diving, contact a national certification agency. The reader is advised that all the elements of hazard and risk associated with diving cannot be brought out within the scope of this text. The individuals, companies and organizations presented in HISTORICAL DIVER are not liable for damage or injury including death which may result from any diving activities, with respect to information contained herein.

HDS Book Exclusive:

HARD HAT DIVERS WEAR DRESSES

By Bob Kirby.





Hard Hat Divers Wear Dresses *is my autobiography, modified. This is not just my story, however. It is the story of many others - good, bad, indifferent, and/or interesting. Once I found myself in the manufacturing business, I teamed up with Bev Morgan and we created the Kirby Morgan Corporation, which later became Diving Systems International and is now Kirby Morgan Dive Systems Inc., the world's largest manufacturer of commercial diving helmets and masks. How did all this take place? How could I have traveled from the wrong side of the tracks with almost no education and, in the year 2000, end up the recipient of the John Galletti Award, the highest tribute in commercial diving? Here I tell the story of those crazy times, with humor as my medium plus an occasional dose of terror.*

— Bob Kirby

An autobiographical, self-published record of the life of the legendary American commercial diver and equipment designer Bob Kirby. Written in Bob's unique style, the book chronicles the events and characters involved in his nearly 50-year diving career. It covers U.S. Navy diving, abalone diving, commercial oil field diving, mask and helmet design, the Kirby Morgan partnership, the SEALAB clamshell helmet, Diving Systems International, the U.S.N. Mark XII, and helmet design and construction for Jim Cameron's movie **The Abyss**, and more. Chapter titles and details are at www.hds.org

Only 1,000 copies. Each individually numbered and signed by Bob Kirby.

Hard cover, 262 pages, black and white photos. $40, plus $8 domestic p&p. CA res add 7.75% sales tax of $3.10. For overseas p&p contact HDS office at hds@hds.org

EDITORIAL

International Depths

The dramas surrounding the rush to complete the last issue of 2002 were made a little more awkward with DEMA's new Fall Show and the mammoth effort of organizing the 10th Anniversary Conference and Rally, all of which ate up an enormous amount of time. So much so that the reports on these events will not appear in this issue.

One of the milestones in modern diving history was reached 40 years ago when Hannes Keller stepped onto the ocean floor at 1,000 feet. In this issue we travel back to the events surrounding this dive and present a blend of first-hand accounts from some of the participants, supplemented with reprints of articles from that time. Now, 40 years later, supporters and detractors of this dive still remain in divided camps, and we expect to hear some differing views in future correspondence.

The Keller dive is well documented and well known in Western diving circles. It is generally considered the first 1,000 foot dive. However, some of our established views of "first" and "deepest" might receive a closer all-round review during the coming year.

At this year's 10th Anniversary Conference the presentation given by our HDS Russia colleague Dr. Alexander Sledkov included some figures "from behind the old Iron Curtain" that made several attendee's jaws drop. The international flavor of the 10th Anniversary Conference was a measure of how far we have come as a Society in such a very short time. Dr. Sledkov's paper, along with those by *The Skin Diver* magazine co-founder Chuck Blakeslee and Australia's Bob Ramsay, will be published by HDS-USA in 2003, thereby sharing their research with all members. Meanwhile, those who are impatient for a preview of Dr. Sledkov's research might want to acquire a copy of his limited edition publication on *The History of Russian Diving*, which is available on page 25.

Leslie Leaney and Andy Lentz

Tribute to Captain Tailliez, the Last of the Musquemers

The Manfish is gone. It's time to reflect.

By Jean-Michel Cousteau

When Captain Tailliez left us recently, I felt a great deal of emptiness, a void. I knew that something very important had just happened. I sensed with great emotion that a page of history had turned. The last of a generation of French pioneers had left. It was a troubling moment and in many ways continues to be and I need to find out why.

As a young boy, I knew Captain Tailliez. He would come to our house with Frederic Dumas and I could see them with my dad, sitting on the terrace like accomplices preparing a coup. I was too young to be involved and didn't know what was going on. Of course now I know — they were talking about new equipment, pioneering the first dive tables, where were they going to go next to experiment with new fins, new masks, a new camera, a new regulator. They were the "Three Musquemers."

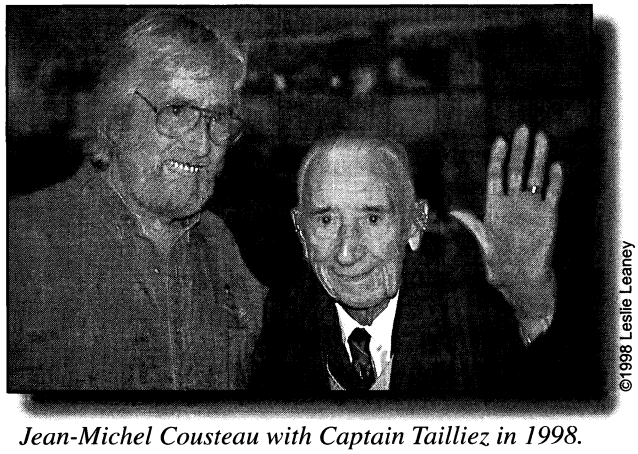
Everything we take for granted today they had to very carefully test and experiment with. We owe them, and few others, the immense privilege of our becoming manfish, too. They did the work. We are now having fun. Four years ago, Captain Tailliez invited me to his birthday celebration and ordered me to bring my dive bag. Surprised, I obeyed and we went diving. The following year, because of a small wound, his doctors said he couldn't dive. So it was decided that he would go under water anyway, comfortably sitting inside the Aquascope, designed by my friend, Jacques Rougerie, who accompanied me. We met Captain Tailliez, underwater flares in hand, outside the window of the Aquascope and attempted, after removing our mouthpieces, to sing "Happy Birthday!"

The next year it was decided to dive in Bandol, where the Three Musquemers made their first Mediterranean aqualung dive in 1943. Needless to say, it was a great moment. After a few difficulties putting on his wet suit and scuba gear, we found ourselves sliding below the surface. I will never forget the OK sign he gave me as Michel Deloire filmed. As we slowly approached the shore, where many of our friends, including Albert Falco, were witnessing this historical moment, I couldn't resist embracing Captain Tailliez. As I wished him his 95th Birthday I was profoundly shocked to see in his face, his eyes, his hair, his nose, his wrinkles: my father's twin! I then proceeded to make a wish. "Captain, my dream would be to come here to dive with you for your 100th birthday." He moved back slightly, looked at me straight in the eye, and said in his charming, stuttering way, "But Jean-Michel, you may not be alive!"

Even at this age, he left us too early. But I will be there to celebrate the 100th year of his birth and to honor him again. Because my father pushed me overboard with a tank on my back when I was 7 years old, I feel that I may end up being one of the oldest divers, if not the oldest, at some point.

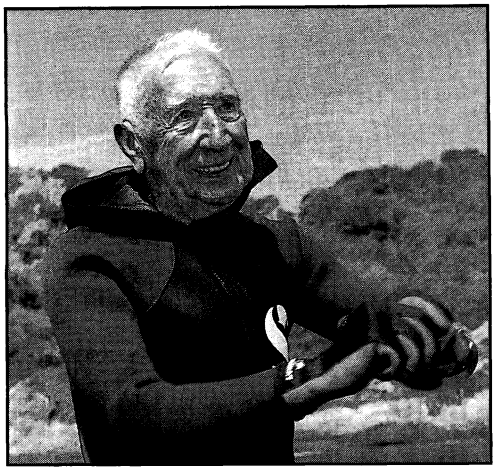
"Captain, I want to thank you for what you've done for all of us who love the sea. As others pay their respect, as you enter the history books, you will always have a special place in my heart. I hug you and don't want to let go."

Jean-Michel Cousteau



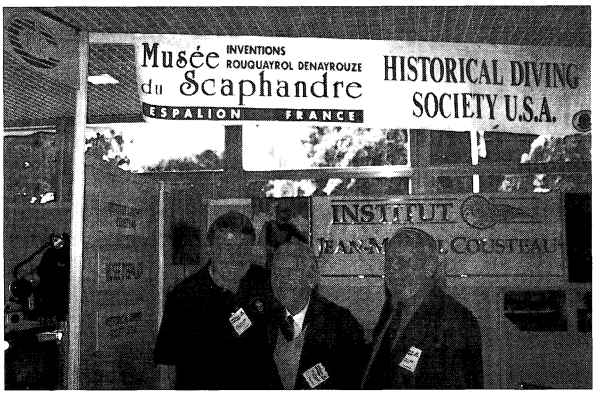
Jean-Michel Cousteau with Captain Tailliez in 1998.

Capitaine de Vaisseau Philippe Tailliez
L'Enthousiasme est la Seule Vertu - Enthusiasm is the Sole Virtue

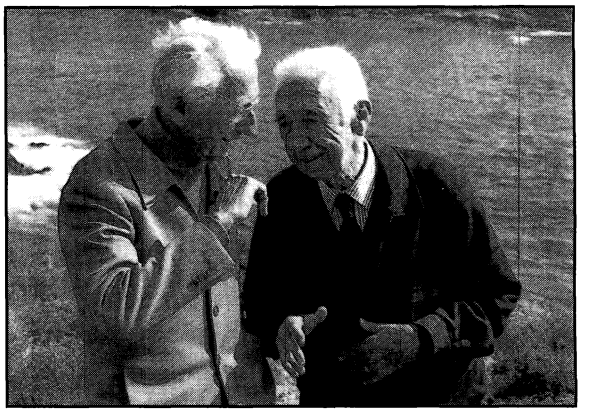


Capitain Tailliez celebrates his 90th brthday with a dive from the Marine Nationale vessel Port Cros. Photo: © Christian Frasson-Botton

1939. Philippe Tailliez on the Mediterranean coast with his early spearfishing equipment. © P. Tailliez Collection



1998. Captain Tailliez (center) visits the joint HDS USA/ Musée Scaphandre booth at Antibes with editor Leslie Leaney (left) and Festival President Daniel Mercier (right). ©1998 HDSUSA



April 11, 1995. Jacques-Yves Cousteau and Philippe Tailliez are re-united on the island of Embiez, at the spot of their first dive together. © Marine Nationale. MP Stainer

Philippe Tailliez passed away on Thursday, September 26, 2002, in France. He was 97 years old. A diver since the 1930's, it was Tailliez who introduced Jacques Yves Cousteau to the sport of goggle fishing in 1936. Two years later he introduced Cousteau to Frederic Dumas and together the diving trio became the famed "Les Musquemers" of the French Mediterranean coast. Philippe Tailliez was a career Naval officer, and in 1945 he became the first commanding officer of the Group d'Études et de Recherches Sous-Marines (G.E.R.S.) This was the first military group to employ the Cousteau-Gagnan Aqua-Lung and in 1949, under Tailliez's command, it produced *Plongée en Scaphandre*. This book was the world's first diving manual to cover the use of the Aqua-Lung and included repeat dive tables developed by G.E.R.S. It was later revised, translated into English and published in 1957 as *The Complete Manual of Free Diving*. Tailliez's 1954 book *Plongées sans Cable* recorded his early diving adventures and was published in English with the title *To Hidden Depths*. His involvement with diving and the sea continued throughout the last half of this century.

Capitaine Tailliez was the recipient of the Society's 1998 Historical Diver Magazine Pioneer Award, and numerous other international awards during his long and distinguished career.

A more complete accounting of his career can be found in Philippe Tailliez - Ocean Pioneer, *by John Fine,* Historical Diver Magazine *issue No. 18, Winter 1999, and parts of his early career in* Jacques Yves Cousteau, The Pioneering Years-Allons Voir, *by Leslie Leaney,* Historical Diver Magazine *Issue No. 13, Fall 1997.*

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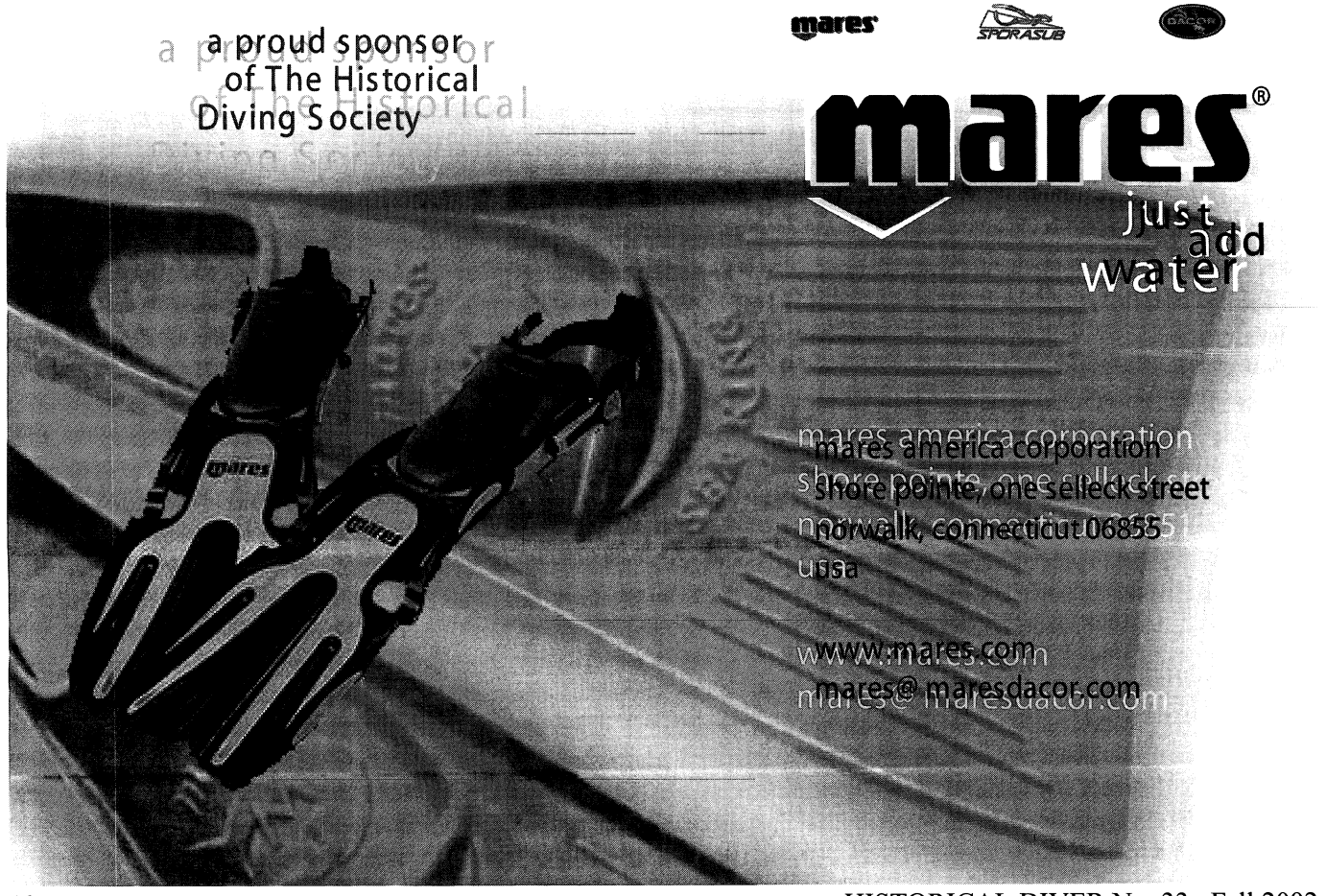


IN THE NEWS

Howard and Michele Hall

Jean-Michel Cousteau in Fiji.

IMAX Coral Reef Adventure

Several prominent divers were involved with the filming of the new IMAX film *Coral Reef Adventure*, scheduled for release in early 2003. Members Howard and Michele Hall undertook a ten-month journey across the Pacific Ocean in the company of scientists to survey and photo-document in IMAX some of the world's largest reefs, and to create an enduring record for their preservation. Along the way the Halls met with biologists and conservationists, including Advisory Board member Jean-Michel Cousteau, and Fijian naturalist Rusi Vulakora. During their four months in Fiji the team made over 2,000 dives, including a series of dives to 350 feet. For more information log on to www.macfreefilms.com.

U.S. Naval School Underwater Swimmers Association. HDS member Bernie Campoli informs us that the Fraternal Order of Underwater Swimmers School is publishing a newsletter for members titled *Buddy Line*. The group's origins are traceable back to the U.S. Navy's first scuba school in Key West, Florida, 1952-1973. The UWSS model Shark and Diver that was originally at the School was recently located atop the Consolidated Divers Unit in San Diego. The 2004 Reunion is planned for San Diego and Bob Shouse and Bernie are acting as the Reunion investigation committee. For more information, contact Bernie at Flafrog@bellsouth.net

Antarctic donation. Thanks to the generous "historical" senses of USAP Scientific Diving Coordinator Rob Robbins, the HDS recently received a donation of retired U.S.D. Royal Aquamaster II regulators and spare parts. Rob informs us that the regulators saw service in the U.S. Antarctic Program from the early 1970's until 1989 when they were retired. The regs were used in McMurdo Sound, Antarctica, by such pioneering divers as Jim Stewart, Paul Dayton, Bill Curtsinger and John Oliver. Rob had them shipped from the Antarctic to Port Hueneme where the HDS picked them up. They are currently being rebuilt by "Scuba Workshop" columnist Kent Rockwell, and will be loaned out to various diving museums. Our thanks to Rob for saving these historic regulators.

Advisory Board member James Cameron in Santa Barbara. Last year Advisory Board member Professor Hans Hass was honored with the Lifetime Achievement Award by the Jackson Hole Wildlife Film Festival. This year another Board member provided the highlight to the Festival's Technical Symposium. The Jackson Hole Tech Symposium, "Digital Synthesis," brought together over 200 tech execs from many studios, networks and post-production houses, electronics manufacturers, documentary and large-format filmmakers for the three-day media event. Over fifty speakers were featured in panels focusing on the convergence between technology and the creative process in a variety of areas relevant to technological advances in digital film production and postproduction.

Highlighting the three-day event was an unprecedented screening by *Titanic* director and HDS Advisory Board member, James Cameron, of his three latest projects produced in high definition for large format 3D theaters. Shot with newly invented technology, miles below the surface of the ocean at the sunken TITANIC and BISMARCK shipwrecks, and through deep-sea heat vents teeming with life, the images were stunning. The technological pioneering that made it possible was staggering, and the audience was enthralled. Lisa Samford, the organization's Executive Director, proclaimed the event a wonderful success. "It is hard to find a place that can match the Tetons, but our Tech Symposium will almost certainly return to Southern California in coming years. The rich talent pool of panelists, and the proximity for media executives and professionals wishing to take part, make it an attractive, focused event," Smford said. The HDS was pleased to be invited to attend this evening of historic underwater imagery. For more information email info@jhfestival.org or log on to www.jhfestival.org.

The History of Subaquatic Development in France

The Histoire du Développement Subaquatique en France (HDS France) has been formed by a group of French diving historians. The inaugural meeting was held on Friday, November 1, 2002 at the 29th Antibes Film Festival, on the Côte D'Azur.

The Founding Committee members are Maurice Braud - President, Philippe Rousseau - Vice President, Gérard Loridon - Secretary, and Pierre Yves Le Bigot - Treasurer. All of these members come with distinguished diving backgrounds. Maurice Braud was involved in the early administration of CMAS, Philippe Rousseau is an acredited historian and the French representative of HDS USA, Gérard Loridon has an extensive career with SOGETRAM and Scaph 50, and Pierre Yves Le Bigot has a long association with the Frederic Dumas Museum. Several French divers and representatives of HDS Italy and HDSUSA attended the meeting, and a report will appear in the next issue of *Historical Diver*. To assist in getting HDS France started, all members will receive copies of *Historical Diver* while the committee focuses on the enormous task of establishing the national infrastructure of the organisation.

Histoire du Développement Subaquatique en France

L'Histoire du Développement Subaquatique en France (HDS France) a été formé par un groupe d'historiens de la plongée sous-marine Français. La réunion inaugurale a été tenue le vendredi 1er novembre 2002 aux 29eme Film Festival à Antibes, sur le Côte D'Azur.

Les membres du Comité Fondateurs sont Maurice Braud - Président, Philippe Rousseau - Vice-Président, Gérard Loridon - Secrétaire, et Pierre Yves Le Bigot-Trésorier. Tous ces membres distinguée viennent du la monde de la plongée sous-marine. Maurice Braud a été impliqué dans l'administration au debut de la CMAS; Philippe Rousseau est historien de valeur et le représentant Français de HDSUSA; Gérard Loridon a une longue carrière avec SOGETRAM et Scaph 50; et Pierre Yves Le Bigot a une longue association avec le Musée Frédéric Dumas a Sanary-sur-Mer. Plusieurs plongeurs français et représentants de HDS Italie et HDS USA assisté à la réunion, et le rapport paraîtra dans les prochains publication d'Historique Plongeur. Pour aider le lancement de l' HDS France, tous les membres recevront des copies de Plongeur Historique pendant que le comité se concentre sur la tâche énorme enfin d'établir l'infrastructure nationale de l'organisation.

IN THE MAIL

March 1982. John Tooker on one of his last dives off Seabrook, New Hampshire.

I wanted to thank *Historical Diver* and Leslie Jacobs for making my retirement interesting. I have enclosed some photos from my work at Seabrook Nuclear Generation Station. The work ran from 1976 to 1983, inclusive. The job was worked around the clock, 24 hours a day, seven days a week, weather permitting. It included the drilling of three intake shafts and 11 discharge shafts five miles off-shore. The intake shafts were three miles north of the discharge shafts. These shafts were drilled thru rock approximately 200 feet down to intersect with tunnels from the shore. Morrison Knudsen of Boise, Idaho was the prime contractor. The diving work included some hand drilling, burning, welding, photography, inspection and the placing of some dynamite.The pictures enclosed mainly show the problem we had with electrolysis deterioration on the shaft cover heads and maintaining their integrity to withstand the water pressure at this depth. Too much erosion could cause a disaster. This was an extremely interesting job.

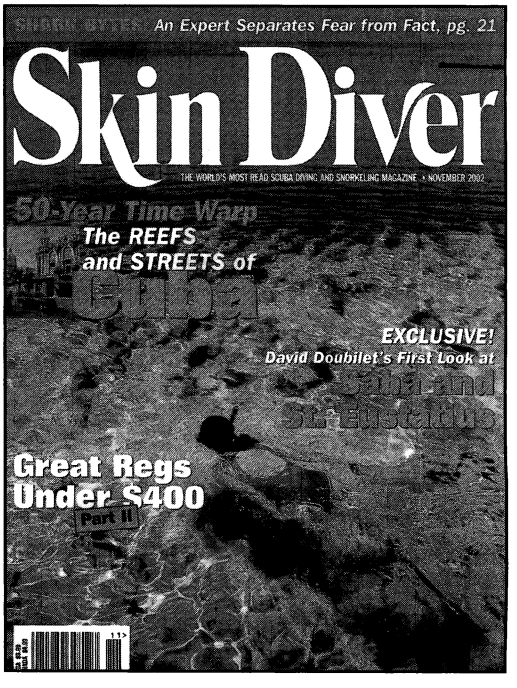
John Tooker
Toms River, New Jersey

John was the subject of "Voices From The Deep" *in issues 29 and 30 of* Historical Diver. *Due to space constraints we are only able to publish one of his topside photos.*

SKIN DIVER MAGAZINE CLOSES —After 51 years of publication, *Skin Diver*, America's longest running diving magazine, has been shut down. The November 2002 issue was the last. Founded in 1951 by Chuck Blakeslee and Jim Auxier, *The Skin Diver* was the cement that held the blossoming American recreational diving industry together during its formative years.

First Issue, December 1951

Recently the magazine had been struggling to operate in a market crowded with diving publications. Publisher Guy Miller said the "state of the market, industry and the challenges presented to the *Skin Diver* business over the past years have been insurmountable." It was with no little historical irony that the announcement was made only days before Chuck Blakeslee presented his paper on the founding and early history of the magazine

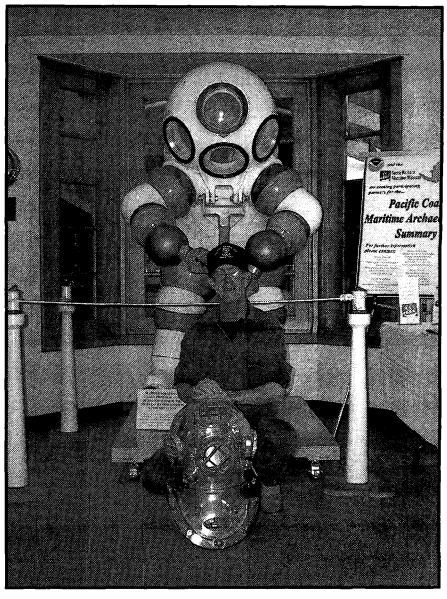


Last Issue, November 2002

2002 Fund Raiser Winners

The Society's Board of Directors would like to congratulate this year's winners and thank all who participated in the Fund Raiser. Your participation helps us to continue to grow and allows us to focus on our mission of education.

Brad Mitchell	Washington	MkV Helmet
Jerry Ippolito	New York	Deep Sea Divers Knife
Scott Naughton	Texas	Two Hose Regulator
Norman Deatherage	California	Siebe Gorman Print
Gene Webb	California	Signed Hans Hass Book
Dave Burbank	Colorado	Morse Catalog
Roger Rodriguez	Lousiana	1943 U.S.N Manual
Harry Garman	Colorado	E.R. Cross Video
W.L Doffing	Texas	Museum Poster
James Heard	California	Museum Poster
Ulf Fredriksson	NORWAY	Museum Poster
G. Laden	UNITED KINGDOM	Museum Poster



Brad Mitchell, winner of this year's Grand Prize, stopped by the Santa Barbara Maritime Museum to collect his new MkV.

HISTORICAL DIVING SOCIETY USA

Bob Kirby and Bev Morgan signing copies of Historical Diver *# 32.*

In 2002, the last major dive show the Society exhibited at was in June at the end of our second quarter. The third quarter of 2002 was primarily taken up with preparations for our 10th Anniversary Conference in Santa Barbara, and the new DEMA Fall Show and third Combined Industry Awards Gala in Las Vegas. To help celebrate the 10th Anniversary, an exhibit of antique and classic equipment was put on display at the Santa Barbara Maritime Museum. These events will be covered in the next few issues.

In mid-July several members attended the Santa Barbara City College Marine Diving Technical Department's annual Heavy Gear weekend class. This popular event, headed by Don Barthelmess, allows attendees to experience surface supplied diving with U.S.N. Mark V gear and other helmets. The instructors included senior divers Bob Kirby, Bob Christensen, and Scrap Lundy, and the class has several repeat attendees who enjoy it so much they cannot stay away. This year's class featured a new presentation by the HDS on the origins of the various components that make up a Mark V helmet, and was again well attended.

The last issue of *Historical Diver,* covering the origins of the Kirby Morgan Diving Systems Inc. (KMDSI) company, generated a great deal of interest. As noted in the article, Bob Kirby eventually left the company in 1986, and Bev Morgan has kept the business going up to the present date. Although all the KMDSI staff had met Bev, most of them had never met Bob Kirby. The HDS contacted current company President Steve Kushner to arrange a special meeting where staff could meet Kirby. On September 26, 2001, the HDS reunited Kirby with Morgan for a special KMDSI staff luncheon. A long line of staff waited to have their photos taken with Kirby and Morgan, and many of them had their copies of *Historical Diver* autographed by the two founders.

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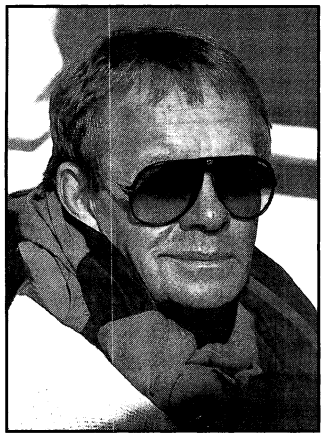
NOGI WINNERS

GERI MURPHY— Arts Award

One of the world's most published female underwater photojournalists, with an impressive record of more than 1,000 published articles, photos and books. She is perhaps best identified with *Skin Diver*, as this magazine showcased more than 170 cover photos over 22 years. Murphy is now a regular contributor to *Sport Diver*, traveling the world in quest of great underwater photos and stories. She is also a member of the Women Divers Hall of Fame.

HILLARY VIDERS— Distinguished Service Award

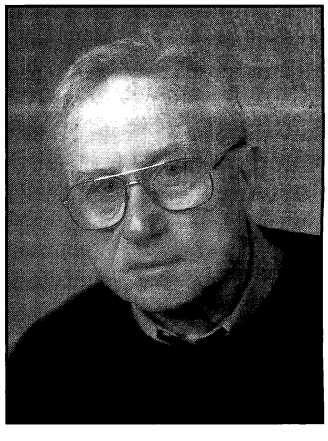
As a speaker, educator, and author, Hillary Viders has brought awareness of our precious and fragile water planet to millions of people. Her lectures, videos, slide presentations and book, *Marine Conservation for the 21st Century*, have received outstanding reviews from scientists, educators and environmental professionals. She has published over 400 articles in 33 magazines and journals, plus academic papers, books, training materials, scripts and book chapters on diving marine science and conservation issues ranging from coral reef ecology to environmental law. Viders is also a founder of the Women Divers Hall of Fame, the world-renowned honor society dedicated to raising awareness of the contributions of outstanding women divers.



BOB HOLLIS—Science Award

Surfacing from his first scuba dive more than 40 years ago, Bob Hollis has climbed the ladder of success as first a retail dive store owner and instructor, to photo equipment designer, to founder and equipment designer for Oceanic and Aeris diving equipment manufacturing firms. Today, Hollis has taken his California-born companies global, with offices and manufacturing facilities in the U.K., Europe and China. His companies are best identified with high tech engineering products such as dive computers, high performance regulators and BCs.

JOHN CRONIN—Education Award



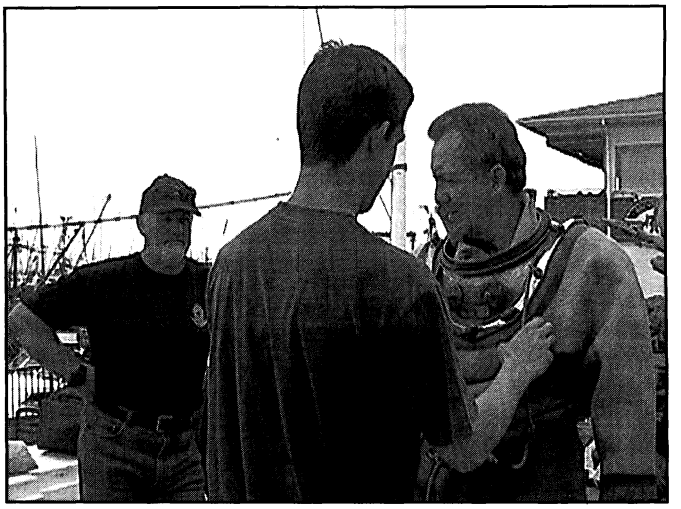
Often described as The Father of Diving Education, John Cronin founded the Professional Association of Diving Instructors (PADI) in 1966. Since then, he has taken PADI to the pinnacle of industry success as the world's leading dive training and certification agency. As part of the PADI development, he published *Undersea Journal*, a magazine for diving professionals; established Project AWARE, a marine conservation foundation; and founded an association for PADI dive resorts. PADI operates in 175 countries worldwide and has more than 100,000 professional instructor and retail members. In 2003 PADI will certify more than 1-million sport divers.

For more information about the NOGI Award and past recipients, please log on to http://www.auas-nogi.org.

HISTORICAL DIVING SOCIETY SOUTH EAST ASIA PACIFIC

2003 Rally and HDSUSA Rally

L-R HDS SEAP Members Mike and Helena Wescome-Downe with Paul Lunn, all from Adelaide, at their booth at DEMA



Peter with Brian and Graham dressing him in at the HDSUSA Santa Barbara Rally.

2003 Rally. In March HDS SEAP will hold the 2003 Rally at Albury, NSW, the venue chosen by members. It is hoped that the convenient travel distance from Sydney or Melbourne will make for a large attendance.

Des Walters of Descend Underwater Training Centre, Albury, will host the welcoming reception on Friday evening. A working commercial diving equipment display will be provided on Saturday by Descend Diver Training, at the "Pit," the local commercial diver training area.

The Albury Hotel is the venue for the dinner on Saturday 15th March and the speakers program on Sunday 16th. Seating is limited for the dinner and the speakers program, so it is on a first come basis. Make payment in full to Descend Underwater Training Centre.

At the Sunday Program the presentations will focus on the life and diving achievements of Australian diving great Ted Eldred, the designer of the "Porpoise Regulator." The Porpoise is considered to be the first production single hose regulator in the world. Ted has graciously agreed to attend over the weekend and well-known historian Jeff Maynard is arranging the speakers program. The Society invites all owners of "Porpoise" equipment to bring photos or even the equipment along to a display to be held at the Sunday venue. This will be a unique chance to have your photo taken with Ted Eldred and your gear. It will also be a very special weekend of Australian diving history.

Contacts: For the Sunday speakers program contact Jeff Maynard. For the Saturday and Sunday program including snack, lunch, and dinner on Saturday contact Descend Underwater Training Centre. Phone 0260 411405, Fax: 0260 216732, email descend@albury.net.au Alternatively contact the shop at 1/826 David Street, Albury, 2640.

HDS-USA Rally. Several HDS SEAP members attended the recent HDS USA 10th Anniversary Conference and Rally held in Santa Barbara, California. Brian Davies (SA), Peter Weir and Graham Weir (NSW), and Bob Ramsay (SA) along with HDS USA member Dave Moran from New Zealand were among them. The Australian lads jumped into the swim on the Sunday and dived the Santa Barbara Maritime Museum Standard Dress under the watchful eye of Australia's favorite "American Diving Legend," Bob Kirby. Bob and Claudia are well and send their regards to their Australian friends. They promise to again visit Australia and NZ soon.

http://www.hdsseap.org

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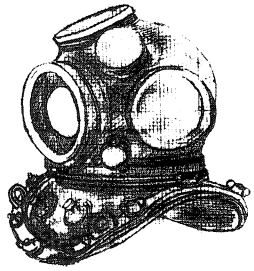
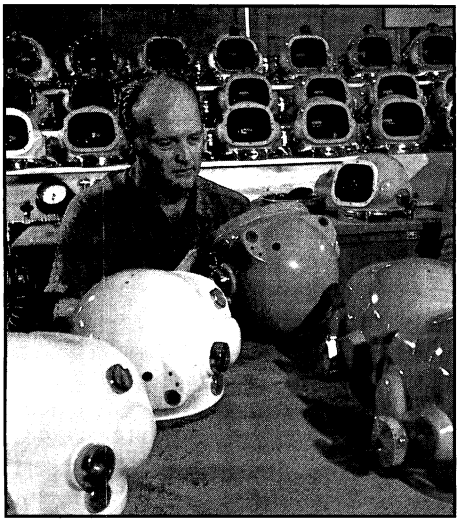
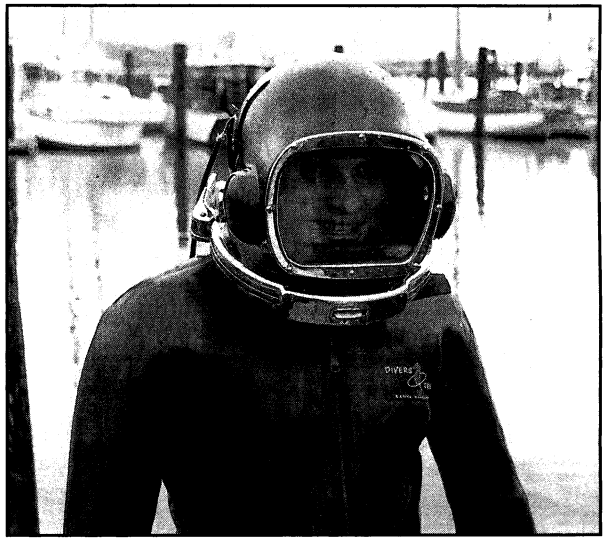


Historic Helmet Album
"The Santa Barbara Connection"

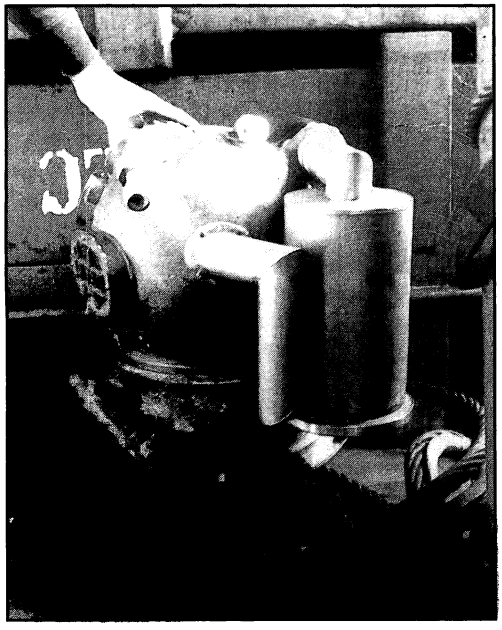
Historical Diving Society – Canada has an extensive archive of early equipment photos which we are pleased to share with readers of *Historical Diver* magazine. From time to time we will run a small group of unpublished photos of equipment categories. The descriptive captions are as our records indicate, but we always appreciate additional information or corrections. We hope you enjoy the material.



"King Rat" surrounded by a group of his loyal subjects. Bob Ratcliffe assembling production rat-hats at Underwater Technology Services, Santa Barbara, CA (a division of Oceaneering International). Photo taken at Yanonali Street or Cota Street location, 1977.

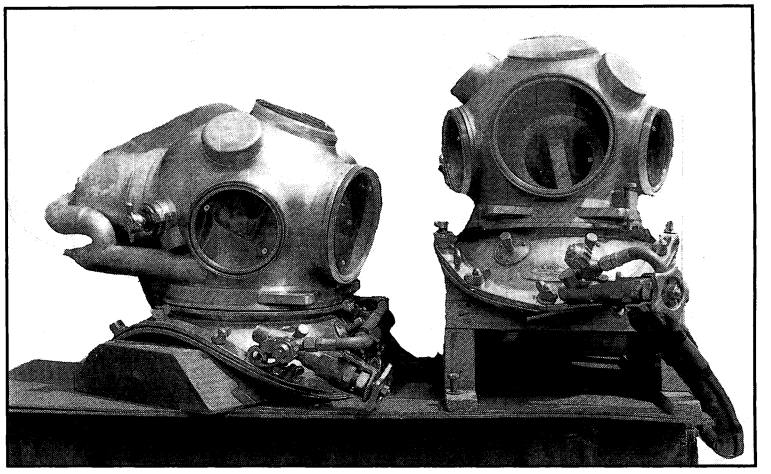


A 'hand-built' rat-hat (prior to production engineering by Len Aaron). Note the demand tube across the bottom of the face-plate. The helmet shown was designed and built by Bob Ratcliffe, and this basic design is generally acknowledged as one of the best gas hats made. Photo taken at Santa Barbara Marina, summer 1966. (Note the Don Duckett wet suit jacket.)



An early Divcon International "stacked canister" design recirculating gas helmet. This helmet was developed for Murray Black, of Santa Barbara, CA. This particular design was used for Divcon's North Sea-based operations and was used to set several surface-supplied commercial depth records, including a 527 foot dive off Tripoli. Photo taken in Libya, circa mid 1960's.

The "Bat-hat," a rat-hat style recirculating helmet designed and built by Phil Nuytten. Photo taken outside CAL-DIVE office on Stearn's Wharf, Santa Barbara, 1966. Helmet had dual side canisters and venturi jet in the back plumbing between the canister caps. Helmet was intended to replace the heavy-gear recirculator helmets for use from small bell systems. After testing, it was decided that the rat-hat demand regulator, fitted with a special venturi system, was a better solution for hard-working mid-water dives.



Two early HeO2 recirculators set up on Yokohama breast plates. Commissioned by Murray Black for Divcon International, and built by Bob Kirby, Santa Barbara, in the early 1960's. Note the US Navy Mark V "belly valve" for air control and the Victor control valve for HeO2 gas cut-in.

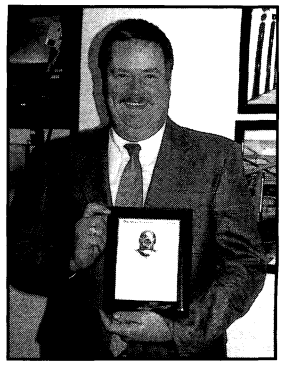
Les Ashton-Smith
BSc. MSc. MBA. CEng. FIEE

When the original Historical Diving Society was launched in the United Kingdom, in 1990, the inaugural meeting was held at the Siebe Gorman works in Wales. One of the Siebe executives who were responsible for hosting this was then-company manufacturing director, Les Ashton-Smith. The HDS was thus born.

In 1994, the original Deane/Siebe helmet, circa 1830, was allowed to leave the Siebe Gorman Museum in the custody of Nick Baker, for display at the HDS-USA Rally. Despite some opposition to this, the decision to permit this was made solely by Les Ashton-Smith.

In 1994, Siebe Gorman celebrated its 175th Anniversary, and a variety of commemorative items were manufactured. The most important of these was the reprinting, in 1995, of Sir Robert H. Davis's book *Deep Diving and Submarine Operations*. Most diving historians recognize the tremendous influence this book had on the generations of divers during the 20th century. This 175th Anniversary printing was the ninth, and perhaps final, edition of the book. The man responsible for that printing was Les Ashton-Smith.

In 1995 Les, and the Deane/Siebe helmet, attended DEMA in San Francisco. His astounding T-shirt-selling abilities on behalf of HDS-USA, coupled with his impeccable credentials for supporting diving history, led to his being appointed to the Society's original Advisory Board.



On the Advisory Board, Les was a clear thinking member with an understanding of international relationships at a professional business level. He was the honest bridge to Europe, and faithfully served the stated goals of the Society.

When Siebe Gorman unfortunately decided to close its operations, Les left the company and became the Managing Director of Surface Inspection Limited in Bristol, England (www.surface-inspection.com). With this move Les severed his ties with the diving industry, but not with the Society, and continued on the Advisory Board until last year.

In recognition of his outstanding service to the Society, the HDS-USA recently presented a special commemorative plaque to Les at his new company headquarters. We are all privileged that he devoted his time in support of international diving history, and wish him well with his new company.

Historical Diving Society Mexico
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Subaquatic Archeology: History Within History

By Camila Villegas

In Mexico, just like in the rest of the world, the link between archeology and diving emerges as naturally as the one established between humanity and water, but in this particular case, circumstances played a big role.

Studying the history of subaquatic archeology is studying the history of studying history. That may sound complicated but is not. Pilar Luna is considered in Mexico a pioneer of this discipline that uses scuba diving as its main tool. And it all began with a little bit of luck and a lot of help.

Back in 1973, Pilar, who was a student at that time, took the first course of subaquatic archeology given in her country. It consisted mainly of teaching the participants how to dive.

Some years passed and a couple of small projects were pursued; but the real turning point for Luna, and for that matter the whole of subaquatic archeology in her country, came in 1979.

Luna was determined to research archeology underwater in a well explored area, and so she did. "I was really naive at the time," recalls Pilar "and I decided to write to Mr. George Bass who is considered the father of subaquatic archeology worldwide. So I wrote him a letter asking for his help. I asked him to come to Mexico and teach a group of students the proper techniques of working with historical objects that were found underwater. Most of these techniques were invented by him."

She was lucky. Doctor Bass found the letter moving and he accepted Luna's proposal. He came to Mexico City in January 1979 in the company of Donald Keith, another important figure. That was the first big step. Lessons included diving, biology, subaquatic photography, law and oceanography. These classes were presided over by Bass and Keith, and were extremely popular. Later, students practiced their new-found skills in the "Manantial de la Media Luna," located in the crater of a volcano called Volcan de Toluca.

But, what was the real goal? It was to recover Mexico's heritage: the history of our country that was buried underwater. The first subaquatic archeological expedition in Mexican waters with Mexican divers and archeologists took place in November of 1979. The site was the Cayo Nuevo Reef in the Gulf of Mexico, where a bronze canyon from the 16th century was found and recovered in good condition.

Then, in February of 1980, the Department of Subaquatic Archeology (within the National Institute of Anthropology and History) was created.

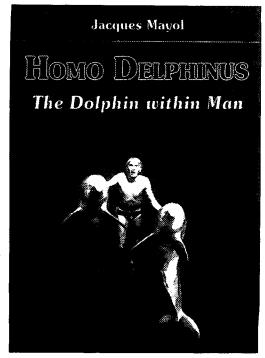
"Our goal is to study humanity and cultures through the objects that they left us," explains Pilar, who since 1982 has been a member of the International Council of Subaquatic Archeology. "That is why it is extremely important to teach people, and especially divers, to protect and respect the things they may come across while underwater.

"Taking or even touching things discovered in the water without a method or the proper techniques means that valuable information about the life and costumes of our ancestors can all be lost in the blink of an eye. Thus keeping tight relations between the worlds of diving and archeology is extremely important."

One example is the recent discoveries made by Pilar Luna and her team with the help of divers in the Yucatan Peninsula. They found remains of animals that have proven to be over 10,000 years old. That is not only history concerning Mexico but the whole world in a cenote (underwater cave).

Without diving, recovering history from the bottom of the sea wouldn't be possible. This has been history within history.

Homo Delphinius The Dolphin Within Man



by Jacques Mayol

Published shortly before Jacques Mayol's untimely death, this magnificent book was an immediate success in Italy, France, Russia and Japan, where it is considered to be the Bible for all breath-hold diving. Mayol takes us to the four corners of our blue planet to meet people who still dive for food the way it has been done for thousands of years. Mayol was a sea searcher, a world famous diver widely acclaimed for his pioneering work in the field of breath-hold diving and for his historic, record setting dive of 100 meters (330 feet). He was the first man to reach this remarkable depth, diving the way dolphins do, with one breath. He went on to hold a dozen world records and is considered by many as the Father of Free Diving. His life was the subject of Luc Besson's film *The Big Blue*. This book is already considered the classic in its field.

9.5" x 13.5" Hard bound in dj. 398 pges, 300 color illustrations. $75.00 plus $14.00 domestic P&P, international shipping contac the office CA Res. add 7.75% sales tax.

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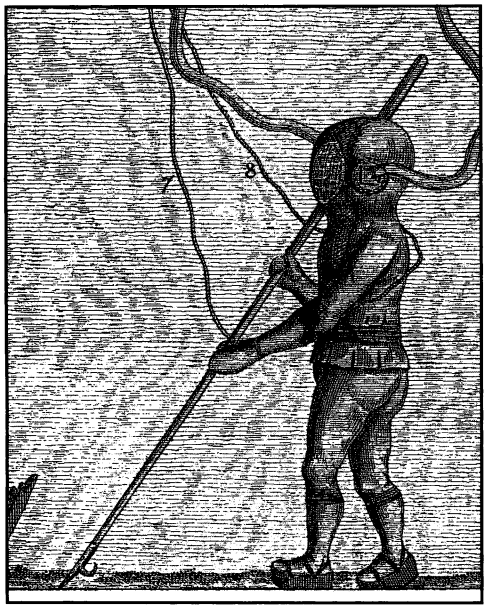
With a Kreeft-suit in a Swimming Pool

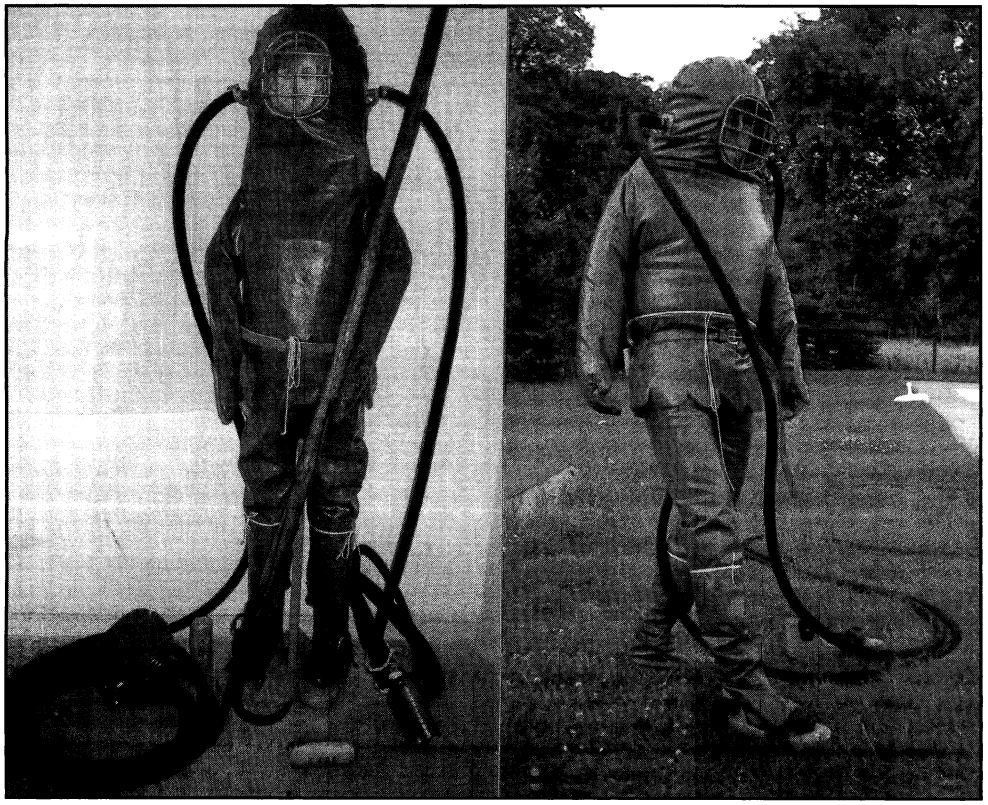
By Michael Jung with photos from Friedrich Hoegner



Friedrich Hoegner, a retired engineer from Ludwigsfelde, is one of Germany's most active constructors in the rebuilding of historical German diving suits. After he built and tested Klingert's diving suit (see *Historical Diver* No. 30, page 21) he has now built a second historical design in a 1:1 scale: Peter Kreeft's suit from around 1800.

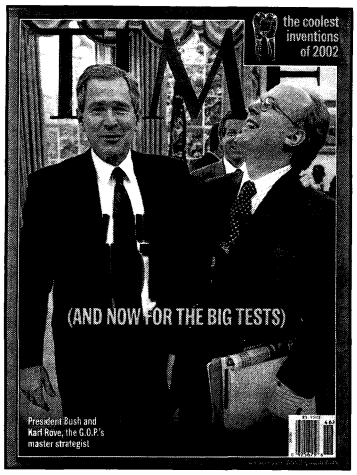
Peter Kreeft's apparatus consisted of a leather jacket that reached to the hips, was furnished with gloves and, on top, was continuously connected to the helmet. It also had leather trousers and boots with soles of lead. The helmet was an leather hood, stiffened inside with thin iron rods, and equipped with an oval, barred window. The helmet-jacket combination, as well as the boots and pants, were made water-tight through the use of circular ring seals. Air was pumped from the surface to the diver by a bellows and conveyed via a hose. A second hose served both to remove exhaled air and as a means to communicate with those on the surface.

According to an eyewitness report, Peter Kreeft — a captain and well-to-do ship owner from Barth near Stralsund — dove in the Baltic Sea several times, and even raised a cargo of copper from a sunken ship. In July 1800, he also demonstrated the suit for the Swedish King Gustav IV, Adolph in Stralsund.



After Friedrich Hoegner tested the homemade suit on the surface, he went to the public swimming pool of Ludwigsfelde-Struveshof on July 27, 2002, to make a real test dive underwater. He was assisted by his son Uwe on the bellows, and his wife Regina on the speaking tube. A local TV-film team was there to film the descent from land to under water. The test dive was a success, and Friedrich stayed 15 minutes at a depth of 2 metres. But he had to carry 19 kilograms of lead on his shoes and 10 kilograms on his belt to maintain negative buoyancy!

HDS Sponsor's Force Fin makes TIME



What goes around comes around, as they say. Bob Evans and Susanne Chess, who own Force Fin, have been loyal sponsors of *Historical Diver* magazine (HDM), which enjoys a small, but constantly growing, circulation of a few thousand readers. Bob's innovative designs have always attracted attention but they recently made the REALLY BIG time when they were featured not once, but three times, in the November 18 edition of *Time* magazine (circulation rumored to be greater than HDM.) Selected as one of the Coolest Inventions of 2002, Bob's Oscillating Propulsion System fins made the Reporter's Notebook section on page 8 on the feet of reporter Maryanne Buechne, then the actual title page of the article, and finally the section on "Out of Doors." Our congratulations to Bob and Susanne on getting Force Fin and the diving industry some very high profile coverage. To see what all the fuss is about log on to forcefin.com. Photo ©2002 David Bryant.

Historical Diving Society Russia

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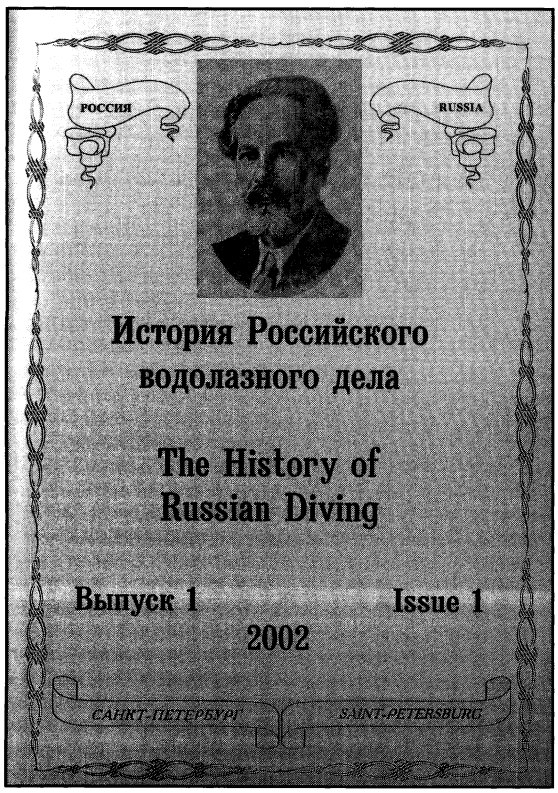
HDS Russia was pleased to be able to attend the American Society's 10th Anniversary Conference in Santa Barbara, and to have the chance to share some of our Russian diving history with members. It was good to meet Leslie and Andy who have been in correspondence with us but we had never met before. We appreciate the opportunity to meet such famous American divers as Chuck Blakeslee, Bob Kirby, Lad Handelman, Dick Anderson and many divers we have read about like Steve Barsky, Manual Lazcano, Bob Evans, Bob Ramsay, Scrap Lundy, Lee Selisky, Bob Wohlers, Kent Rockwell and others.

Our visit to America was a great adventure and we were also pleased to be guests at the HDS-USA booth at DEMA in Las Vegas. We do not have such a thing as Las Vegas in Russia. It was our pleasure to attend the International HDS meeting with Thomas from Germany, Phil and Virginia from Canada, Bob from Australia, Manual from Mexico and Lee and Leslie from USA. We hope everyone was happy to meet HDS Russia. Also we were happy to be guests of USA at the big Awards Gala. So many famous divers!

Before we came to America we have completed publishing the first HDS Russia publication. Sponsored by SHELF and written by HDS Russia Director Dr. Alexander Sledkov, *The History of Russian Diving,* Issue 1, is limited to only 999 individually numbered copies. It is 82 pages with several images and the text is in both Russian and English so many people can learn of our history. As mail from Russia is sometimes difficult we ask the USA to sell the issue for us. All the money will be held for HDS Russia and used for the next publication. So please buy our first book so we can publish another one! We wish to thank Secretary Jim Cunningham for arranging and hosting our visit to USA. It could not have happened without him and Lee Selisky. We hope to see many USA members in Saint Petersburg one day.



The History of Russian Diving
An HDS Russia publication

Includes diving history from the earliest times and much Russian diving history that has never before been published in English.

Soft bound, 82 pages, black and white illustrations, Russian and English language. Limited to 999 numbered copies. $10, plus $4 domestic p&p, Ca res. add 7.75% sales tax. Overseas orders contact HDS-USA office for p&p rates. All proceeds go to HDS Russia.

Рис. 34

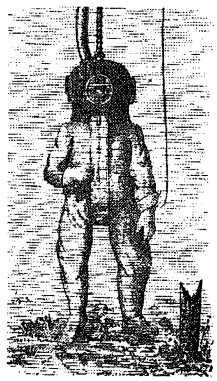
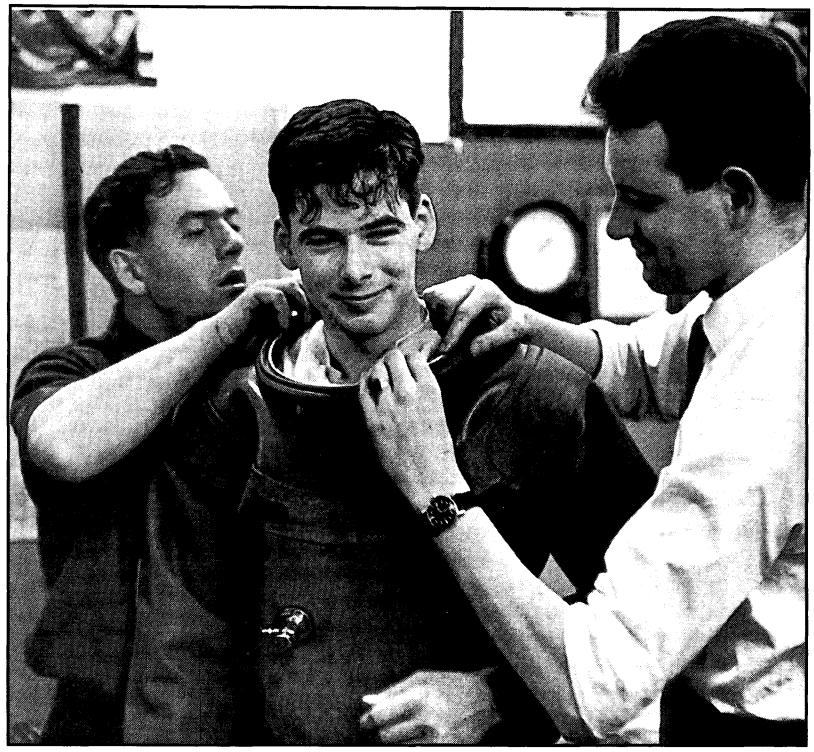


Рис. 32

40 Years Ago
The 1962 Hannes Keller 1,000 Foot Dive



Hannes Keller prepares to enter the wet diving tank at the Naval Weapons Plant in Washington D.C. for a simulated dive to 700 feet.
Photo courtesy U.S. Navy

INTRODUCTION

In 1962, an important milestone in deep diving was achieved off the coast of Southern California. A young Swiss professor, Hannes Keller, and his British associate, Peter Small, attempted what is believed to be the world's first 1,000 foot open water dive. Two senior HDS members, Al Tillman and Dick Anderson, played key roles in the project. Now, forty years later, *Historical Diver* revisits that historic event in six chapters.

A few weeks prior to the dive, Keller presented a paper on his work at the Second World Congress of Underwater Activities, in London, England. *Historical Diver* is pleased to be able to reproduce the complete text of Keller's paper, plus the few questions he answered at the end of his presentation. Titled "Towards the Limits of the Continental Shelf," Keller's paper is the first chapter of this article.

In Chapter Two, Thomas Tillman, son of dive training pioneer and author, Al Tillman, covers the overall story of the dive. In Chapter Three, Al Tillman recalls the background of the dive from his perspective as one of the staff at *Skin Diver Magazine*. Al's recollections are excerpted from his book *I Thought I Saw Atlantis*, which also contains information on post dive events and the politics surrounding some of them. Space limitations prevent us from including them here. The fourth chapter comes from Dick Anderson, who was one of two safety divers. Dick remembers his dive partner that day, British diver Chris Whittaker, and it was Anderson's diving skills that probably saved the day from being a total human catastrophe.

The fifth chapter is a reprint of the report on the findings of a special committee convened immediately after the dive. The sixth and final chapter covers views expressed one month later by Hannes Keller in January, 1963, when he met with diving experts in London.

By the nature of these six individual chapters, there is some duplication of information. *Historical Diver* acknowledges that there were, and are, many more opinions from divers of authority, both then and now, covering the operation and results of this dive. *Historical Diver* is happy to consider any further information or opinion for publication in a future issue. - Leslie Leaney

Chapter 1

TOWARDS THE LIMITS OF THE CONTINENTAL SHELF
by Hannes Keller

Ladies and Gentlemen, it is an honour and a great pleasure for me to tell you of the story of the work which a handful of friends have helped me to do in the past four years. I learned to skin dive just under four-and-a-half years ago; somebody told me of his dives to 100 feet and I got interested in this kind of adventure. Very soon I discovered that there are a lot of problems in diving, and being sure that most of these problems would not resist a mathematical analysis, I looked out for some good friends who might help me with the realisation of the adventurous experiments I had in mind. Somehow the idea of trying to dive as deep as a man with a frogman outfit could go fascinated me. At that time I was teaching mathematics to engineering students, and with the money I was earning I bought an old gasoline drum for the price of one dollar and converted it with the rest of the money into a one-man diving bell. With this bell I intended to do deep dives and to study first the famous "rapture of the depth."

Keller with IBM data processing equipment working on his decompression tables.

Probably destiny itself made me meet Professor Bühlmann from Zurich University. He is a famous specialist in the field of the physiology of respiration, and one nice summer afternoon I appeared in his office and explained to him the problem of narcosis. I was very astonished to hear from Dr. Bühlmann that he did not believe in the toxic effect of nitrogen; he thought that the narcosis was due to the change in the mechanics and especially in the regulation of respiration under pressure, which depends strongly on the work performed by the diver. Parallel to this, the activity of oxygen in the diver's compressed air reduces the sensitivity of our regulation centers and finally carbon dioxide poisoning builds up until the diver acts as if he were drunk. I explained to Dr. Bühlmann that this theory, if it could be proved, would mean a complete revolution in diving and this interested him, and finally he joined me and my other friends.

NO RAPTURES

In November, 1959, I dived with the bell to a depth of 400 feet, not far from Zurich, staying four minutes at that depth. I was breathing, at that depth, a mixture of 95% nitrogen and only five per cent oxygen, and was trying hard to avoid working in order to keep respiration easy and normal. I was exceedingly afraid, but I felt no rapture at all and I answered all the questions asked by the reporters aboard the diving vessel through the telephone. All the outfits we were using were hand-made and home-made on Saturday afternoons and in the evenings during the week. All my friends appeared to pull on the cable or to help me to go down and come back. After only an hour I came to the surface again, happy, and to tell the truth, a little bit astonished that the Bühlmann experiment had succeeded so perfectly. Now we had proof that "rapture of the depth" could be avoided in diving, and we wanted to prove further that a man can operate in 500 feet equipped with a frogman outfit only, but this was much more difficult than we ever thought it would be.

After some unimportant experiments, I made the most dangerous experiment I have ever tried. I was using two small boats as a diving base, each 100 feet apart from the other. On one of the boats we had a cable with a 200 pound weight hanging down to 700 feet. From the same boat an air hose came down with me to a depth of 150 feet. I could switch my regulators by hand from the tanks which I carried to the hose and back. The hose was very important because I did not want to take the pure oxygen for decompression down with me, but left it at the surface under the control of the crew. On the other hand, I wanted this weight and unlimited reserves for any case of emergency. From the second boat, with a telephone station, I jumped into the water and swam the 100 feet to the other boat and down the leading cable to 150 feet. At that depth I fixed the end of the air hose to the leading cable and switched my breathing apparatus to the tanks on my back, and then I continued to dive to 400 feet. All the time I was secured by the telephone cable, which should have led to the second boat at an angle to avoid this cable twisting round the leading cable; but at the depth of 400 feet I discovered that I had used too much gas and had now only

two further minutes of breathing gas. I gave emergency signals to the crew and pulled strongly on the cable, but I was in difficulties with the cables and the signal lights. I managed to get back to 150 feet on empty tanks, to the hose, but then the air hoses had a breakdown and I had to manage the direct ascent. The men on deck tried to get me out of the water but the cables were mixed up in such a way that it took them 20 minutes to get me out of the water.

During the ascent and handling operations at the surface, I was afraid of getting paralysed or blind — one of the dangers of decompression accident when coming to the surface, and in such a short time as I had been rushed out of the water I would normally experience a dangerous formation of gas bubbles in the blood and tissues of the body. The only treatment that is possible is to put a diver immediately under pressure again to squeeze the bubbles away. Fortunately enough, we had a small decompression chamber in the village close to the place where we were diving. We gave a decompression of 45 minutes and I left the chamber without any symptoms either before or after. In itself the experiment gave us valuable information. It proved what, in principle, we had calculated before, namely that the diver who moves at 100 feet per minute can go to 400 feet and back without decompression. The decompression in the chamber we actually did because we did not have sufficient control over the experiment, and because we did not search to know what we had found, we had just found it accidentally. When I entered the chamber I was not quite sure if I would continue to dive, but coming out I felt quite all right and happy and thought: "Well, it won't happen a second time, so that is quite reason enough to continue."

Hannes Keller
Photo: Skin Diver Magazine

Again I met failure. All the time I had to come to the surface from a depth of some feet, and every time something went wrong and the faces of my friends grew longer and longer. The man who took the film pictures let his camera which was still running sink down. He no longer had the courage to take pictures with people standing around me as if they were attending a funeral.

Quite a lot of people who met me in the streets smiled at me, but together with my friends I believed in success, and after about 10 experimental failures I thought I ought to know perfectly how diving should not be done, so that by now I should succeed. I sold some of my books and a record player, scratched some money together and gathered everyone around me, announcing that the big day for a world record of frogman diving would be on next Sunday afternoon at 2 o'clock. A big problem was the telephone connection between the diver and the doctor; sometimes it worked, sometimes it did not. From Saturday to the unforgettable Sunday my friends worked on the telephone. During the check we had a breakdown and we switched it again and that time it worked. I went into the water and swam to 40 feet where I stopped and gave orders to take me back. Nothing happened. Again I said rather sharply: "Take me back". No reaction. Upon my emergency signals they took me back but I got the idea that with a telephone connection which made it impossible to understand: "Take me back", I would not be safe. I had no further money to spend, so this was the end of that series of trials.

500 -FOOT DIVE

However, that day a man I had never seen before, who did not understand anything about diving, took 500 dollars out of his pocket and, handing it to me, he said: "There is no signature necessary. Next time the dive will succeed." So, with no newspaperman around, no spectators of the big show, everything worked well. I reached 500 feet in a normal frogman outfit, I stood on a little platform which was hanging on the telephone cable, and I was equipped so that I could swim around — only I did not wish to do so because the visibility was less than five feet in the dirty water. Decompression took just 30 minutes. Naturally everybody was happy at the source of our victory over the complete breakdown in our equipment.

After this successful dive of 500 feet, I wanted to do more and better work, and I thought that with the work we had done we just had the basic idea about how to dive at 1,000 feet. One thousand feet is the most important level in the ocean. Around the Continent there are shallow water zones, at the continental shelf. Three zones can be distinguished in the ocean: the shelf zones, with average depths of 700 feet; the deep sea zones, with an average depth of 13,000 feet, and extremely deep sea,

with a depth of 35,000 feet. The 700 feet zones are large, reaching out into the sea for 200 miles in some cases and, because the diver swimming around can reach it, we think that a diving suit will be quite the ideal tool to perform any job in these areas.

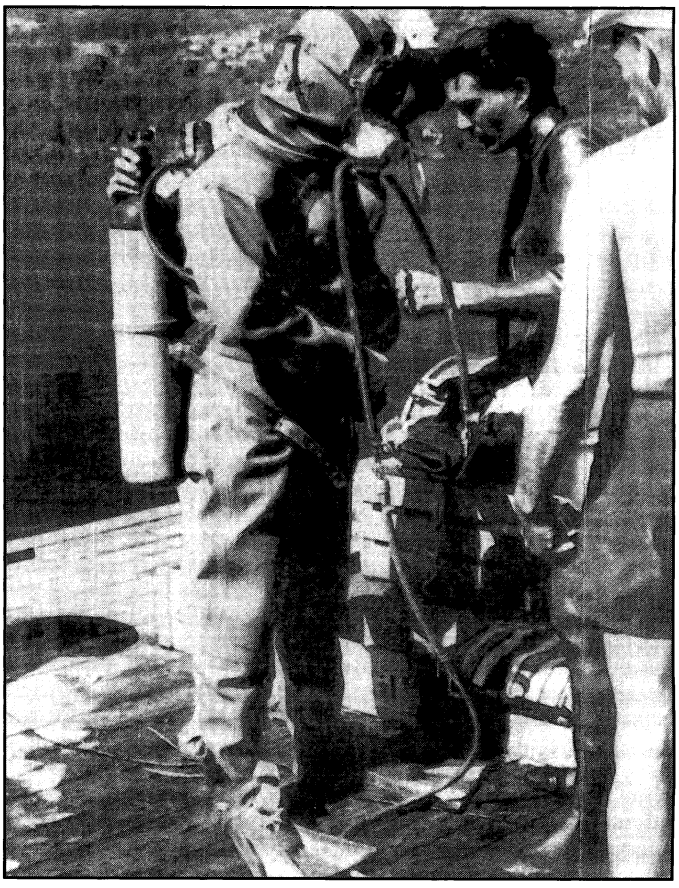
The European shelf is all round Scandinavia and Great Britain. The whole area belongs to it and a lot more. All these areas are not as deep as 1,000 feet. The average depth is about 700 feet, so you see I had to go quite a way into the open sea if I wanted to do a deeper dive. The North American shelf is especially important in the Mexican Gulf where there is now enormous off shore activity from the oil companies. The total surface of the continental shelf amounts to 16 million square miles, which is twice as much as the surface of Europe or as much as Africa. All this together means that when you can dive to 1,000 feet human activity will extend to a new big continent which is life in three dimensions rather than only two.

The 1,000 foot dive is something like the Lindberg flight: if you can fly over the Atlantic you can connect any points in the world by plane, and if you can dive to 1,000 feet you can reach any point of the continental shelf. Looking from the Eiffel Tower at Paris you realise that it is not easy to dive to such a depth; there are problems of connections to the diver and so on. The big problem of descending to great depths is not pressure itself. The pressure exerted by water at a 1,000 foot depth, though it increases to a weight of 600 tons pressing on the total body surface, does not affect the body at all. Theoretically a man could even stand a pressure at a depth of 35,000 feet, or 70,000 feet if he wanted it. There is only one reason why no man will ever swim down to 40,000 or 35,000 feet; the chemical reactions in the human body will undergo a change under pressure, even at 10,000 feet, and will overthrow the chemical equilibrium of the body. Pressure at 10,000 feet would cause some unknown sickness in a diver and make it impossible for him to live. But we think that this problem does not exist before you reach the depth of about 3,000 feet.

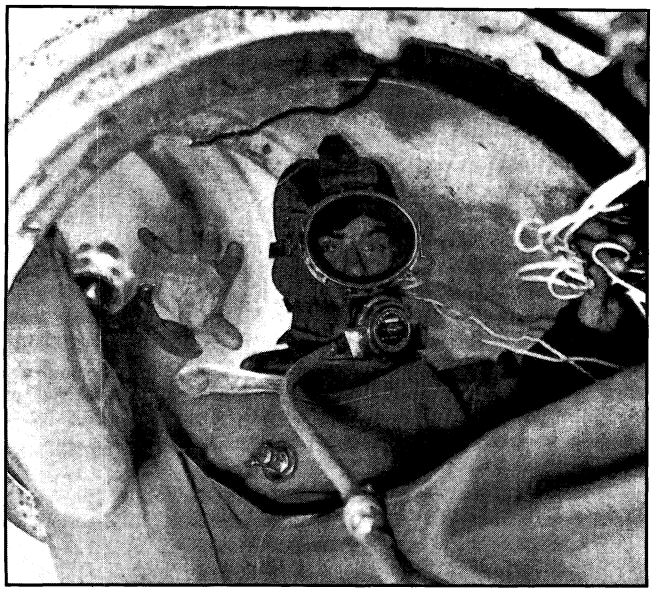
DECOMPRESSION CHAMBER EXPERIMENT

One of the most important preparations was the calculation of decompression tables for these depths. I did them by using an electronic computer and calculated 20 pounds of valuable new decompression tables. With these valuable 20 pounds I made a trip to Toulon in France to check them myself in the laboratory of the French naval base, and at the center for Recherches Sous Marines I found a decompression chamber to do this. I wanted to show that a man can stand a pressure of 1,000 feet and get back to the surface in reasonable time using the new decompression tables and a gas mixture. Breathing oxygen during two hours reduced the amount of nitrogen in the body tissues and reduced the danger from the amount of bubble formation in the case of accident. This pre-oxygenation is today no longer important for my dives and so I let it go completely. With all my equipment I got into the big steel chamber where the pressure can be simulated with compressed air. From this chamber, where medical treatment under pressure can be done, I went down to the high pressure chamber where pressures up to those at 1,000 feet water depth can be created. Commandant Tailliez, who designed the chamber 10 years ago, told me after the dive of how people laughed at him for making it when he said that it should stand that pressure and that he expected that some time people would use it.

The experimental chamber was filled with water in order to have realistic conditions for my simulated dive, and with me I took all the equipment and gas-systems, and only the telephone connected me to the outside, to the ear of Dr. Bühlmann. I got down and the assistants closed the door; I got into the water and applied my telephone connection. The door was closed and the pressure was built up. I was sitting on a chair bodily, but my soul was standing on one leg. Dr. Bühlmann controlled my respiration by means of a throat mike — he would have stopped the experiment in the case of anything going wrong — and the other assistants were checking the diving tables and



Keller in the oufit he wore on both his 425 foot and 1,000 foot record dives.



Keller submerges in a high pressure chamber for a record dive to a simulated depth of 820 feet.
Photo: Skin Diver Magazine

the depth indicator. Another medical officer was standing at the window close to my face controlling the expression of my eyes, but since I have been married these studies have had to be started all over again. I was brought up to 800 and 900 feet and 1,000 feet, and I remained for a couple of seconds under this pressure and then returned. Altogether I stayed for two minutes between 700 feet and 1,000 feet, and nobody before had experienced pressure greater than 600 feet. I felt quite wonderful, especially after the experiment when I had the feeling that I could go much deeper, but there was no chamber available to man to do so.

The day we returned from Toulon to Switzerland, I ordered such a chamber which would allow us to do 1,500 feet and then I looked around to get a man to pay for it. I did not find him until today, but the chamber got built.

A big thing we checked on at Toulon were our special gas mixtures which allow very short decompression to the diver. We found that by using certain gas mixtures, decompression, even after deep dives, becomes extremely short. Naturally, at the same time the diver has no sickness at all. I was diving at 1,000 feet within 10 minutes and at the same time the medical officer from the French Navy had been under pressure of 200 feet. My decompression took only 34 minutes and I had a lot of fun, while the naval officer needed 30 minutes more for decompression from 200 feet. This was a wonderful illustration of the capabilities of our methods. Next day another dive was on the programme — 10 minutes of hard work under pressure at 700 feet depth. I had a weight of 70 pounds which I had to lift on a table two feet high 10 times per minute during 10 minutes. Dr. Bühlmann was watching me carefully from the window and gave me the signal when to lift and when to put down the weight. This dive proved successful too, and showed that a man can do hard work under pressure, as you have at 700 feet water depth, without being affected by any sickness. Decompression took about 140 minutes.

I repeated this dive using a pressure chamber at Washington, but now there were a couple of people saying that there must be something special about Keller. They could not believe in the results we had just demonstrated, so I had to show that any other man could do the same dives as I did. I made such a dive in Lake Maggiore in 1961. I took a passenger with me to 728 feet for a price of 2,000 dollars for the return ticket, breaking the world record again. My passenger was Kenneth Macleish of "Life" magazine. We used a platform for this dive too, and attached to it were six big gas tanks with a compressed gas mixture, and the whole thing was hanging on a cable. All our friends were assembled again on the diving raft to control the dive, and it took 15 minutes to reach 728 feet. Only one thing went wrong: at the surface, in the blazing sun, we perspired so much that the suits got completely wet inside, and when we went down we felt rather cold, but we reached it and came safely back within 45 minutes.

Kenneth had never dived before to more than 200 feet. He had come to Switzerland to be instructed by me in three days, and we had only dived just three times together when we broke the record. On Sunday at four p.m. we dived to 100 feet, on Monday at nine a.m. we dived to 300 feet, and at seven p.m. we dived to 300 feet. On Tuesday at one p.m. we dived to 728 feet, and the experts were especially astonished by this very fast sequence of three deep dives within only 48 hours. They were rather more astonished than they were by the record itself, but all this is naturally just a question of playing a little with mathematics.

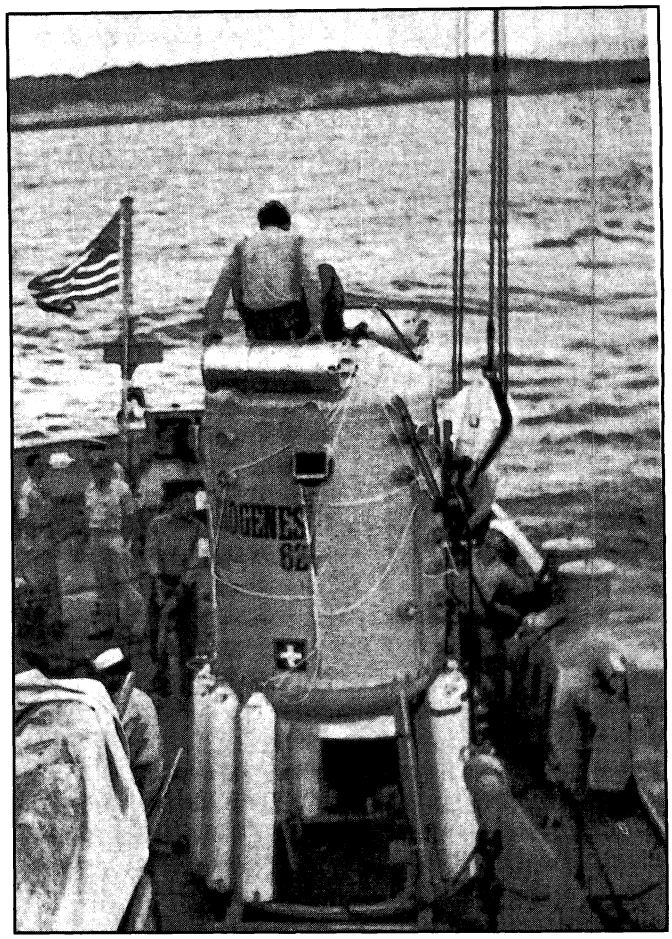
1,000-FOOT DIVE PREPARATIONS

We were still preparing the 1,000-foot dive and a lot of training had been done as well as a lot of checking in the swimming pool. New apparatus became a necessity and we constructed a new kind of diving gear with a semi-closed circuit, especially designed for extreme depths. A lot of checking technical prototypes in our laboratory went on. The details had to be perfect, but most of the work had been done in the new laboratory at Zurich. At the University we now have a small pressure chamber, where pressure up to 1,500 feet can be simulated. It is a very small chamber with only one compartment, and there is space inside for one or two men. To prepare our 1,000-foot dive we made a number of decompression experiments and studies on breathing mechanics, and

Dr. Bühlmann measured the mechanics of respiration in the lungs. Naturally, it would have been easy to take the equipment we had used for the 728-foot dive with Macleish and just extend the technique to 1,000 feet depth, but we felt that this would not do any good. The reason why we do the research is not to break records but to find a perfect way to perform practical work at extreme depths. I personally feel responsible for the fact that when divers go down to 1,000 feet depth everyday they will be able to use a safe and perfect technique. All that we are doing now is just the beginning, and it takes a lot of hard work to learn more.

The funny thing is that we learned a lot from my failure, but on the other hand naturally the money we need for doing failures will only be got by being successful, but I really do not care most of the time about success too much because we get such a lot of information by meeting failure. All we have learned up to now seems to indicate that the equipment available today for normal methods of performing diving is not practical, nor safe enough, when you want to go down to extreme depths in long dives. A diver in such a case cannot any longer just go to the surface if something goes wrong, from 700 or 1,000 foot depths in a direct ascent you will not reach the surface alive. The deep diver is the prisoner of the depths and relies literally completely on his equipment. This is the big problem of deep diving which has not yet been solved, and most of our time, more or less 95% of it, is just checking new equipment to develop new apparatus and to learn more about how to do it. We did a lot of test dives with new equipment in our Swiss lakes. Problems came up with the use of regular equipment at extreme depths. At 600 feet, for instance, a normal regulator begins to freeze because the gas consumption reaches about 20 cubic feet per minute, and the temperature of the gasstream goes down as far as 500 centigrade below zero. This makes diving impossible.

Our new semi-closed circuit reduces gas consumption to three per cent at that depth by cleaning the used gas and using it over and over again. This apparatus allows us to dive for about four hours regardless of the depth, which can be as much as 1,000 feet, for instance. We do all our dives with a modified frogman outfit. We feel that it would be much easier to break records by using a hard helmet apparatus, but on the other hand we know that the hard helmet diver at extreme depths cannot properly be saved by his crew on the boat and is in great danger due to his bad flexibility. We are sure that only a deep diving technique based on the frogman method has any future. The necessary equipment does not exist, and so we have to approach the diving technique and we have to use very complicated methods based on the idea of establishing an artificial surface at depth, a necessity as long as experimental work is being done.



Keller demonstrated his diving equipment and techniques to the U.S. Navy

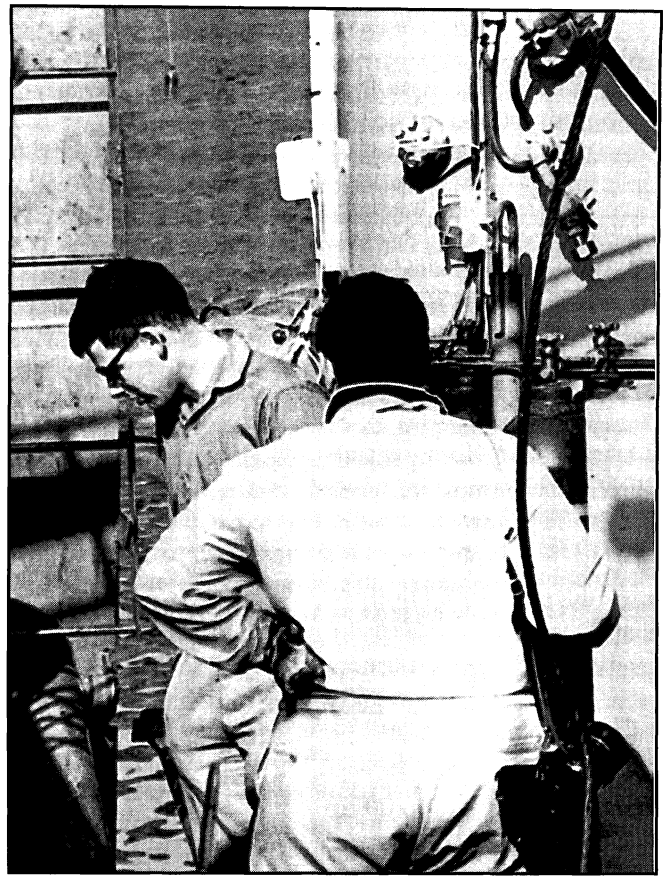
Photo: Skin Diver Magazine

We do not actually believe in the easy-to-get success which we could have by using a hard helmet and just going to 1,000 feet. We even have the idea that we are ready to go to 1,500 feet, but it does not make sense if technical application and the ability to use methods do not go parallel to science. I wear a frogman suit of Spirotechnique, the constant volume suit, which I consider to be the only suit which can be used for these experiments.

OPERATION ATLANTIS

Now we got ready for the 1,000-foot dive, which had the name of "Operation Atlantis". In order to get down to 1,000 feet, and in order to do valuable experiments, we constructed a vehicle that would take the diver safely to the bottom of the sea and bring him safely back to the surface. It is a submersible pressure chamber big enough to carry two divers. It hangs on a special non-rotating steel cable. There is a red telephone cable, which leads to the surface at a distance of 100 feet from the steel cable, and an air hose from the chamber to the surface, 300 feet in length, which is yellow. So we have three connections from the chamber to the surface. Below the chamber

hangs a weight of about one ton to pull the chamber down, and around it are the gas tanks and compressed air. Inside the chamber there can be two divers, or in special cases three. They carry the semi-closed system on their back. Under the chamber is a door which can be opened from the inside, and outside the chamber there are a number of tanks containing compressed air and mixed gases. This is opposite to a submarine, we can only have more pressure inside than out.



Hannes Keller on the deck of EUREKA prior to the 1,000 foot dive.

Photo: Bob Johnson

All the cables lead parallel down to avoid their twisting. At 300 feet we disconnect the air hose and fix it on the steel cable. The whole hose we then take down and connect again when we are coming back from 300 feet, and then we get our gases from the surface. Going down, the pressure inside the chamber and outside is the same, and from the tanks around the chamber we blow compressed air into the chamber to keep the water out of it; and when we come to a depth of 500 feet we shut the fresh air supply, and from 500 feet going down to 1,000 feet we no longer blow the water out. Through the door the water now penetrates into the chamber until the chamber is half filled and then we are at 900 feet and have to prepare for landing on the bottom of the sea. Then we stop and at the surface a swimmer jumps into the water and fixes a buoy onto the steel cable. This buoy has to keep the main steel cable straight so that it does not twist around and tangle the cables on the bottom. Then we descend again until our main weight reaches the bottom, and now the chamber is about 20 feet above the bottom and there we are. We then open the door and one after the other we leave the chamber. Because it is half filled with water it is very easy to swim out of the chamber. During our historic first dive to 1,000 feet we will touch the deepest point on the continental shelf zone. The connection out of the chamber consists of cables for each diver, so we are all connected with the surface even when we are swimming around, and in case of an emergency we could get back into the chamber and would be in safety immediately. We shall be trying to do this dive in the next few weeks off the coast of California, and it will make history because it will be the first time the continental shelf zone gets touched in these depths. We plan to swim around for five minutes at 1,000 feet before getting back in the chamber and inside the chamber we can safely do decompression and there is no longer any risk of accident. We think that the use of such a chamber is the safest way of doing this kind of experiment, by giving the diver an artificial surface with all its safety, even at these extreme depths.

Naturally, later on, when we have developed our method to the proper point, the chamber will no longer be needed in order to perform deep dives. Then a diver will be able to go down just with a special outfit and a single connection to the surface.

When we get back into the chamber from our bath at 1,000 feet, we will blow the water out and dry the chamber. It is specially important to have the chamber filled to half its volume with water because otherwise if one of the divers had any trouble it would be impossible for the other man to pull the diver into the dry chamber, but with the wet chamber it works perfectly. Then we close the door and nothing can happen any longer. The chamber is taken back to the surface immediately and we keep the pressure inside the chamber until the decompression ceremony is finished.

Two days ago we had the chamber successfully at 700 feet in a Swiss lake and we found that the described technique is practical. Naturally, the 1,000-foot dive is the most important dive of the whole series of experiments, as for instance is a one-hour dive to 300 feet with 80 minutes decompression, a 20-minute dive to 650 feet, and so on.

Up to now we have done 14 experiments with pressure depths of more than 650 feet and we have never had any serious trouble. The shallowest dive we did was for two hours at 120 feet with no decompression. Naturally, our work will continue after these dives and we think we are just at the beginning, but I know that never in my life

again will I have the opportunity to be the man to whom it is given to open a new space.

I thank you for your very kind attention.

QUESTIONS OR COMMENTS

Lieutenant-Commander Hamlyn: Well, I have been to the movies and done a number of things, but I have never listened to such an astonishing performance as this, and I know very well that you all share my enthusiasm. It really has been an incredible performance, not only, of course, by Mr. Keller but, I am sure he would be the first to admit, by the team behind him. I can visualise floods of questions coming after all that, and if Mr. Keller is prepared to answer questions after that performance, perhaps someone would like to start.

Question: May I ask Mr. Keller if he or any of his companions have ever suffered any symptoms of oxygen poisoning in this series of dives?

Mr. Keller: I myself suffered from it through a mistake in switching mixtures, I once got a mixture of 50% oxygen at 500 feet, and that is no good. But on the other hand, in all the experiments which have worked there we have kept the oxygen limits exactly within the limits allowed by the United States Navy Diving Manual, and we think that the United States Diving Manual gives the safe limits and we are always inside these limits.

Question: Do you have to keep switching your mixture as you descend, and is there any possibility of doing that automatically?

Mr. Keller: It could be done automatically, but it would again give rise to new problems and for the moment we have enough. So we use prepared mixtures and switch very easily, doing so by hand. On the other hand, we are sure that a diver has an urgent need for something to do and observe during the dive, otherwise he will be too scared. I know that.

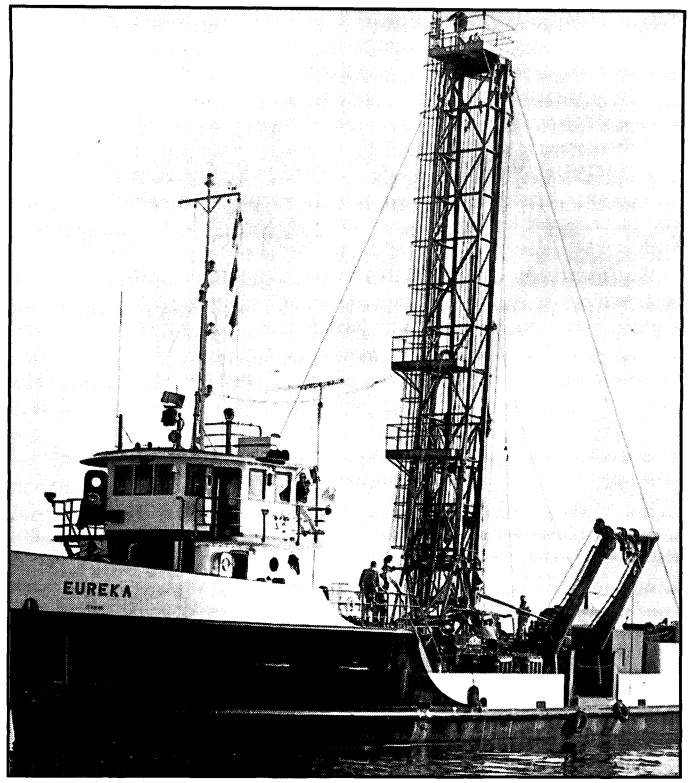
Lieutenant-Commander Hamlyn: I am very sorry to let Mr. Keller leave the platform, and I will just see him off by saying that I know that there are probably many of us who do not agree with everything he does, but you cannot argue with success.

From The Undersea Challenge. *A report of the proceedings of the Second World Congress of Underwater Activities. Edited by Bernard Eaton. Published by the British Sub-Aqua Club. ©1963 British Sub-Aqua Club*

Chapter 2

The Keller Dive Reviewed by Thomas Tillman

Two human occupants sat inside the steel cylinder called *Atlantis* as it was lowered into the waters off Catalina Island, California at precisely 12:06 pm on December 3, 1962. This cylinder was destined to make history on that day. The deck of the operations ship, EUREKA, was filled with anticipation as Swiss scientist Hannes Keller and British journalist Peter Small descended to be the first human beings to ever set foot on the Continental Shelf, approximately 1,000 feet below the surface. This historic event epitomized scientific triumph under the sea, but would also end in the tragic loss of two men's lives.



December 3, 1962. The EUREKA *oil-drilling platform with its winch over the side. One thousand feet down, suspended from the cable, is the bell of Keller and Small.*

Photo: Bob Johnson

The story begins in Switzerland in the late 1950s when Hannes Keller was teaching engineering in his native town of Winterhur. Keller was looking for a hobby to keep him occupied and early attempts at flying proved too costly for the young teacher. He was finally turned on to skin diving by a friend and he focused his efforts and spare time on learning all he could about the sport. He discovered through his research that very little was known about diving science and that the scuba equipment available limited free divers to less than 300 ft. Keller's scientific curiosity led him to come up with the theory that a diver could breathe a different combination of gases than those that make up the air we usually breathe and thereby extend the depth limitations imposed by human physiology.

Keller discovered that several scientists, and even the U.S. Navy, had been experimenting for years with mixed gases and an engineer from Sweden made a successful dive to 600 ft., but died because of mistakes by the support team on the surface. Based on this experiment, Keller went to the University of Zurich to meet with Dr. Albert Bühlman, who specialized in the respiratory and circulation systems. Bühlman told Keller that he believed that narcosis was caused by carbon dioxide, not nitrogen, as previously thought. The two scientists agreed to work together and Bühlman recommended what gases Keller could use to make a safe deep dive. Keller attempted to use these gases by diving to 400 ft. in Lake of Zurich in a converted oil drum. The dive proved successful without any medical problems. Keller was ready to test the limits of the Bühlman gas mixture.

Using early computer technology, Keller fed a quarter million computations into an early IBM computer to find ascent times, depths, and decompression procedures. Armed with the secret Bühlman gas mixture and these new calculations, Keller began to experiment with ever increasing depths. In 1960, he made a 500 ft. dive, and then a two-person dive to 728 ft. in Lake Maggiore, Italy, breaking the previous record of 600 ft., made by a British Navy helmet diver.

After this record breaking attempt, Keller was contacted by the U.S. Navy and they gave him a grant to continue his research for potential use in rescuing men off submarines. Keller proceeded to plan the historic 1,000 ft. dive to take place off Catalina Island. He built the 7' x 4.5' *Atlantis* bell, with a hatch in the bottom so divers could exit and enter at depth.

Keller arrived in Los Angeles in mid-November with a team of men who had helped him with previous dives, and a journalist named Peter Small, who had persuaded Keller to let him accompany him on the record dive. Two local divers soon joined the crew. One was an experienced diver named Dick Anderson and the other a British Sub Aqua Club diver named Chris Whittaker, who was attending UCLA. These two men became the "safety divers" for the record dive. Shell Oil Company had provided a decompression chamber and a ship named the EUREKA for the dive. *Skin Diver Magazine* had funded the communications center and had sent dive training pioneer and writer, Al Tillman, to record the event. The U.S. Navy sent three officers to observe the dive. *Skin Diver Magazine* also arranged for several boats to hold observers and journalists from around the world to witness the event.

On the morning of December 3, 1962 the EUREKA departed from Avalon on Catalina Island bound for an area

where the bottom registered a little over 1,000 ft. Small and Keller had made several preliminary dives, one of which was to 300 ft., where Keller and Small swam outside the Atlantis for 1 hour. Small came down with a mild case of the bends after one of the preliminary dives but was treated and given the go-ahead for the final dive. At around 10:30, the EUREKA was located over the dive site and Small and Keller began preparing for the dive.

A little after 12:00 the Atlantis began its decent. At 250 feet, Keller and Small switched over to the special gas mixture strapped on their backs. At 12:29 the *Atlantis* reached 1,020 ft. Several minutes later the Navy observers, and both the American and Swiss crews watched on television screens as the dark figure of Hannes Keller exited the hatch of the *Atlantis* and made history comparable to Neal Armstrong's first step on the moon or Charles Lindberg's Paris landing. But that moment also marked the beginning of a series of mishaps that would end in the deaths of Peter Small and Chris Whittaker.

Peter Small, Hannes Keller and support crew prepare for the 1,000 foot dive.

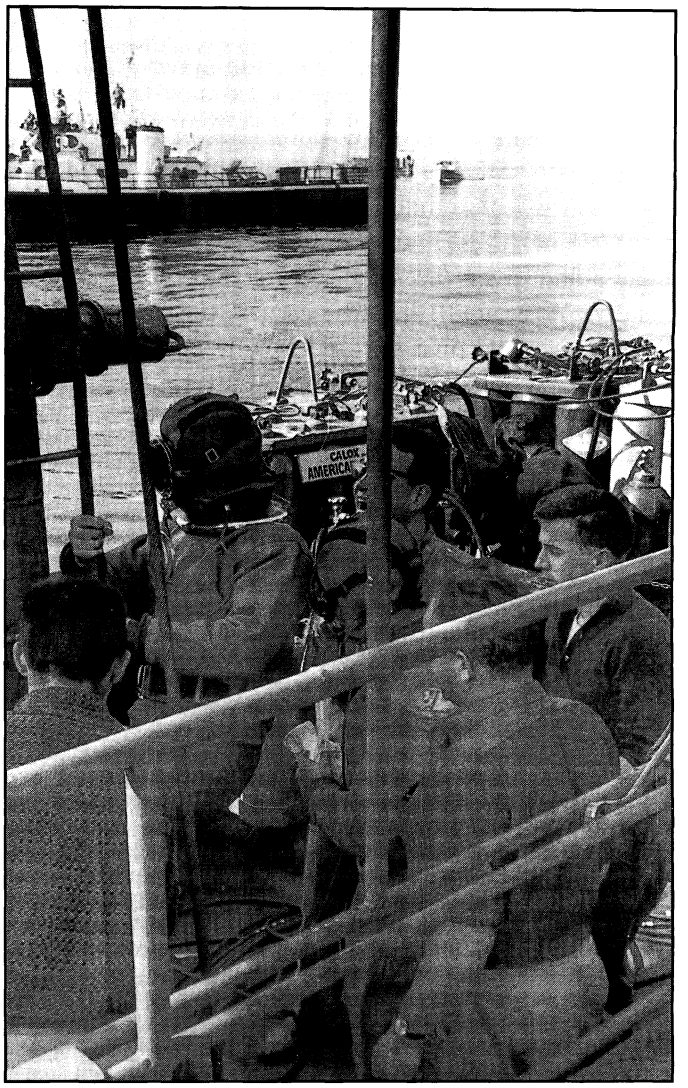
Soon after exiting the *Atlantis*, Keller dropped the Swiss and American flags that he planned on planting on the sea floor to mark the event. Keller had refilled Small's tanks, but decided to plant the flags with only three minutes of gas in his tanks. On his way out of the hatch, Keller's mask became entangled with the flags and two of his three minutes were lost in getting untangled.

He immediately returned to the *Atlantis* and he and Small closed the hatch. Then came the fatal mistake.

Keller was disoriented when he returned to the *Atlantis* and instead of refilling his tanks with the Bühlman gas mixture, he opened the air valves and filled the *Atlantis* with ordinary air. Keller ripped off his mask to breathe the air and within 30 seconds he had passed out. Much of the scene had been witnessed on the closed-circuit television screens above and the surface crew began raising the *Atlantis* immediately. Small passed out two minutes after Keller and neither could be seen on monitors after that point. Within six minutes of leaving the bottom, the *Atlantis* was halted at 200 feet because it was not maintaining pressure and severe decompression problems could be caused. Anderson and Whittaker went down to check the *Atlantis*. After reaching the bell, the two divers found and closed the external valves and returned to the surface, but the *Atlantis* was still not maintaining pressure. Al Tillman and Comdr. Nickerson both warned Anderson not to go down for another dive. Despite the fact the Whittaker's nose was bleeding and he appeared tired, the two divers took it on their own to descend again. They discovered the pressure loss was due to the tip of Keller's fin being stuck in the hatch preventing a proper closure. Anderson cut the fin and the hatch sealed. He then sent Whittaker to the surface to instruct the crew to raise the bell. After several minutes Anderson was forced to the surface to find out why the *Atlantis* was not being raised. Tillman recalls his words. "The hatch is closed," he said. "Where's Chris?" Chris Whittaker was never seen again and his body was never recovered.

At around 1:00 pm the *Atlantis* was lowered onto the deck of the EUREKA with Keller and Small unconscious inside. Keller awoke at around 1:05 pm, but Small remained unconscious until 2:30 pm. Dr. Bühlman interviewed both men by phone from the outside. The EUREKA was headed for shore by this time. When it finally arrived and the *Atlantis* was being lowered onto the Long Beach Pier with Keller and Small still in decompression, Small once again lost consciousness. When the *Atlantis* was finally opened around 7:00 pm, Small had no pulse and was immediately rushed to the navy hospital ship **USS HAVEN** where he was pronounced dead. Keller came out with no negative physical effects, but was faced with both the legal questions and the emotional problems that were to result from the loss of two friends during his record dive.

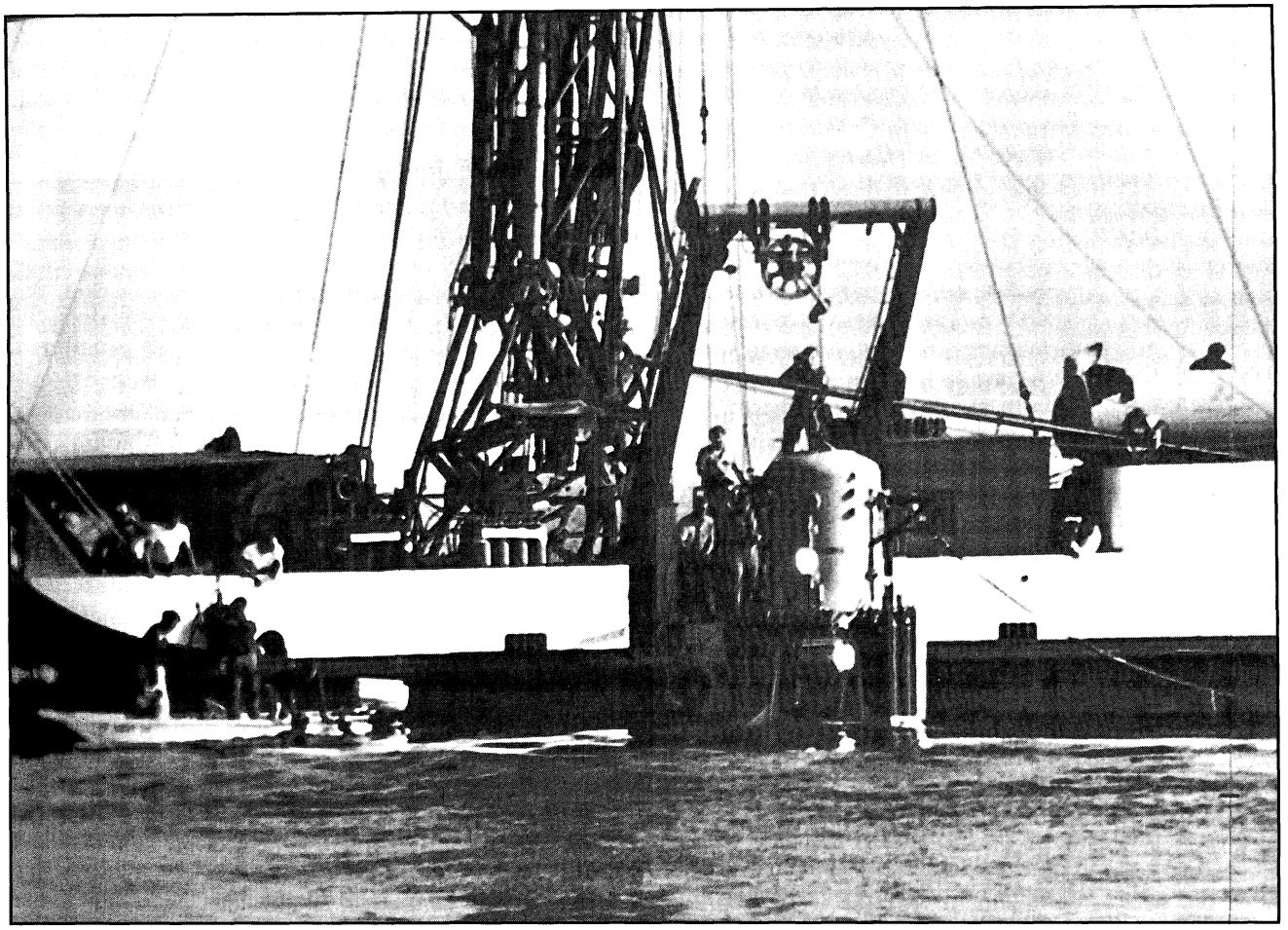
The events of December 3, 1962, despite its tragic aspects, were an historic step toward significantly advancing undersea research. Keller and Bühlman's work was cornerstone research for much of the mixed gas technology that followed. Keller had proven his theory and brushed aside the long decompression ordeals that preceded his experiment. The oil companies benefited by this new technology because it provided the industry with less cumbersome means of working on the sea floor. The Navy also benefited from their initial investment of funds and personnel, with new calculations that advanced their knowledge of submarine rescue procedures.



Hannes Keller and Peter Small prepare to enter the bell.
Photo: Paul Tzimoulis

Chapter 3
The Keller Dive
by Al Tillman

The Hannes Keller dive to 1,000 feet on December 3, 1962 was a technical breakthrough in diving. Thomas Melching of IBM contacted *Skin Diver Magazine* about helping stage a deep dive to 1,000 feet in the channel between Catalina island and San Pedro, California. No diver had ever been out in the water at that depth before. The idea was to gain public attention to a system of regulated mixtures of normal gases to shorten the decompression process. Oil exploration was red hot and



With its underwater lights blazing, the bell is returned to the surface. The men in the small boat at left are mounting a search for Chris Whittaker.

Photo: Bob Johnson

rough North Sea storms were a great hazard to the working divers trying to follow normal decompression tables after supersaturation.

The system had been worked out by a Swiss math professor named Hannes Keller using IBM's giant new computer in Zurich. Keller had been on vacation in Greece and got inspired by scuba diving. He decided he could put his brain in tandem with millions of computer calculations and move diving further along than the decompression procedures that had been used for so many years.

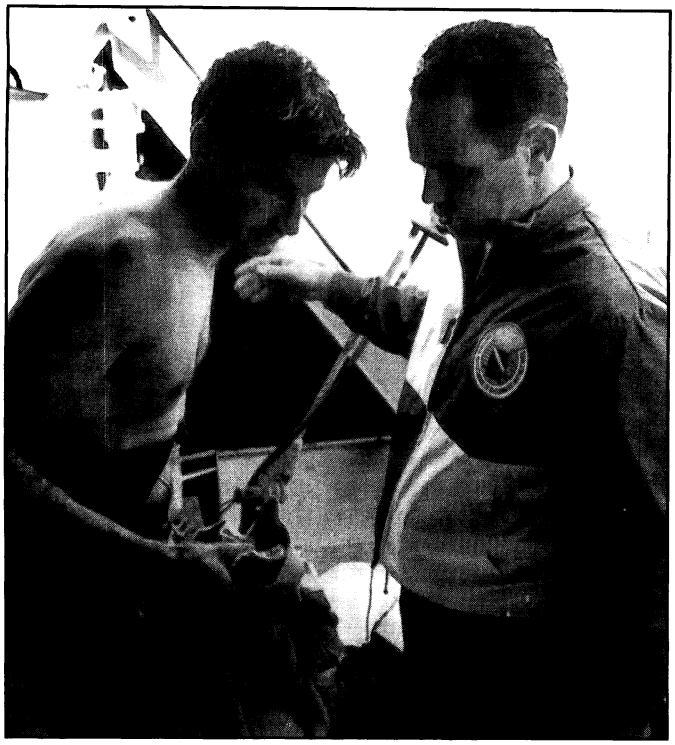
Keller had done a number of test dives, dry and wet, with the system. He went down with a *Life* (Magazine) reporter named Ken McLeish and bent him a bit. But Keller didn't suffer any effects so became suspect of having some special physiological power that others didn't possess.

He made laboratory runs to 1,000 feet in a chamber with Peter Small, journalist and Editor of the British Sub Aqua Club's journal, *Triton*. The only complaint came from Small, who said Keller had brought warm apple juice, "which was bloody disgusting," to quench their thirst as the chamber heated up. But nobody else suffered any symptoms so the system was ready to debut in a media unveiling dive.

Mechling, who more or less represented IBM, paved the way for Keller in the United States. The US Navy was very interested but they weren't ready to jump in as sponsor. Dutch Shell Oil Company was in, providing the mother ship the EUREKA, which had a sophisticated stabilizing system without anchoring and also had all the winches and rigging necessary to lower the chamber to 1,000 feet. Mechling then got Jim Auxier and Chuck Blakeslee of *Skin Diver Magazine* interested and willing to assign me, as *SDM*'s Public Affairs Director, to help with the public information service.

I met Tom and Hannes for lunch at Musso and Frank's in Hollywood. Mechling was tall, distinguished looking in a black suit. Keller looked like a freshman science student, glasses, spiky dark hair, very thin and dressed in casual non-descript clothes.

I had read a little about Keller and his ideas but I had a lot of trouble keeping up with his enthusiastic, technical explanation of the dive. What Keller wanted from *SDM* was a trip out in the channel to scout the diving spot, all the media publicity possible and a back-up



Dick Anderson (left) and Al Tillman
Photo courtesy Paul Tzimoulis

two-man team of safety divers. Jim and Chuck told me to go for it.

I went to Ben Mintz, who was a professional publicist I'd worked with a lot on the Film Festivals. [Tillman was one of the founders of the Los Angeles International Underwater Film Festival. - Ed.] Together we did the usual mail outs and conducted a major press conference at the Ambassador Hotel in Los Angeles. The conference was open to the public as well as the television, radio, and newspaper reporters. It was a chance for everyone concerned about aspects of the dive to come forward and ask questions of Hannes Keller and his physiologist and mixed gas expert, Dr. Albert Bühlman. Mechling and IBM had dropped out by this point, November of 1962. I'm not sure why unless it was because they didn't gain that much from either success or failure of the dive.

I picked up Paul Tzimoulis, who was Sportsways' top salesman and was in town to go out and shoot pictures of the preparation dives. There was a lot of testing of the 7' x 4'5" chamber, named *Atlantis*, to 200 ft. depths at the final dive site, mostly unmanned. Herman Heberling, who was a diving hobbyist with money went down on one of the manned dives that Keller had asked me to go on. [Tillman was unable to make the dive due to prior commitment.-Ed.] Heberling (having taken my place) got slightly bent but he wasn't in very good shape and that could have been a contributing factor. The incident didn't slow down the project a bit.

The big day finally came and the EUREKA and another ship full of media and other observers from everywhere started out from Avalon Harbor towards the dive site. The observer ensemble had been partying late into the night before. I had gone to one and listened to all the criticisms of how the Keller dive was poorly put together, mainly from the institutional divers who weren't asked to participate but had come to socialize and use their publicly funded expense accounts. I lost respect for a lot of important diving personalities at this point. It was all about what Keller had failed to do rather than his achievements. Everybody seemed to think they were smarter than Keller...most of them were certainly drunker.

I had assembled a team of photographers that included Sam LeCocq, Jim Auxier, and Harry Wham to record everything about the dive on deck and off the closed circuit television that would record everything within the *Atlantis* as the dive progressed. I also talked with the two divers who would be the emergency safety team to scuba down in case something had to be adjusted on the *Atlantis*, but nobody really expected that we would need them. The divers were 30-year-old Dick Anderson, a very experienced commercial and sport diver, and Chris Whittaker who was a 19-year-old British Sub Aqua Club member with an impressive diving log. The use of Whittaker was criticized because of his youth, but the defense was always "How old does a fighter pilot have to be to be sent into combat?"

Dick and Chris both volunteered at a meeting on the Underwater Film Festival that we were having at Gustav Dalla Valle's house. The Keller dive was the hot topic of conversation and the commercial manufacturers and retailers were having doubts about the dive being good for sales of sport diving equipment. Everybody, however, wanted to be part of this momentous event in some way.

On the day of the dive, the (EUREKA's) stabilizer put us dead on the chosen site and firmed up as a platform. Everything seemed ready, with Keller and Small suiting up in dry exposure suits. Peter Small's wife was helping him into his.

There was word passing around on deck that one of the gasses being used had leaked. The decision was made to execute the dive anyway. I had reservations about whether this was a wise decision, but Keller and Small, the main risk takers, said go and that they believed they were safe. The U.S. Navy observers aboard, Comdr. Nickerson and Dr. Workman didn't seem too bothered by it either.

At noon the *Atlantis* went under with Peter and Hannes aboard. They reached 1,000 feet and Keller pushed open the hatch and signaled for Small to stay inside. The flag [Keller took American and Swiss flags to unfurl at 1,000 feet. - Ed.] enveloped Keller as he stepped out at 1,000 feet and he pulled it loose to float away with the current. He was in the water at a depth no diver had

ever been before. Keller also knew at this point that he had to speed things up because of the leaking gas quickly depleting.

Back inside the *Atlantis*, Keller found Small passed out, having failed to plug into the oxygen supply. Keller closed the hatch...or at least thought he had closed it,.... and tried to administer to Small. Both men had slumped from the view of the closed circuit camera and no communication was being received on deck. Keller also lost consciousness within a few minutes.

Worry and activity exploded on deck as *Atlantis* was raised to 240 feet where it stopped when the deck gauges showed pressure was not being held inside — the *Atlantis* had a leak!

Could it be that one of the relief valves on top was jammed open? All eyes went to Whitaker and Anderson. "Send them down," someone was shouting, "They must close the valves on top."

Anderson and Whittaker went into the water with double tanks and were on their way down. About ten minutes later they resurfaced and Dick said, "We closed all the valves." There were loud voices crying, "It's still leaking, somebody must go back down."

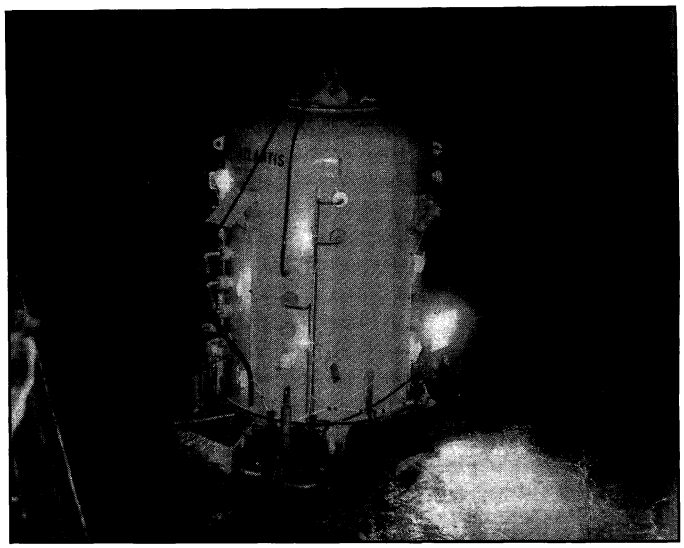
Whittaker was bleeding from his nose and I was talking to both of them. "Come on out you guys, you can't make another deep dive. We'll get somebody else." But in the midst of the battle, men press themselves on, and so did Whittaker and Anderson. They weren't listening to anyone but the Keller crew who were urging them to check again.

Anderson and Whittaker descended again. A long ten minutes went by and then the pressure seemed to hold. Meanwhile, a couple of Scripps divers decided to get into it and were on their way down to *Atlantis*. Within a minute or two Anderson had surfaced and the Scripps guys came up fast riding the *Atlantis*.

Anderson was explaining that he found the tip of Keller's fin protruding, holding the hatch slightly open, enough to leak the pressure. Dick had taken his diving knife and pushed the fin in, closed the hatch and held it until it sealed. He had sent Whittaker back up to tell the deck crew what had happened. He delayed, to make sure the hatch was secured, then came up himself. "Where's Chris," he asked on the surface. "Didn't he tell you to pull it (*Atlantis*) up?"

Whittaker did not surface and never would. He was never seen again. I suspect that he drifted with the current, maybe blacked out, and perhaps came up on the wrong side of the ship where nobody was stationed. He may have been too tired to fight the current and nobody would hear him over the excitement.

Now all the attention was on the *Atlantis* lying on the deck. Keller was now conscious again and talking



Atlantis after the dive.

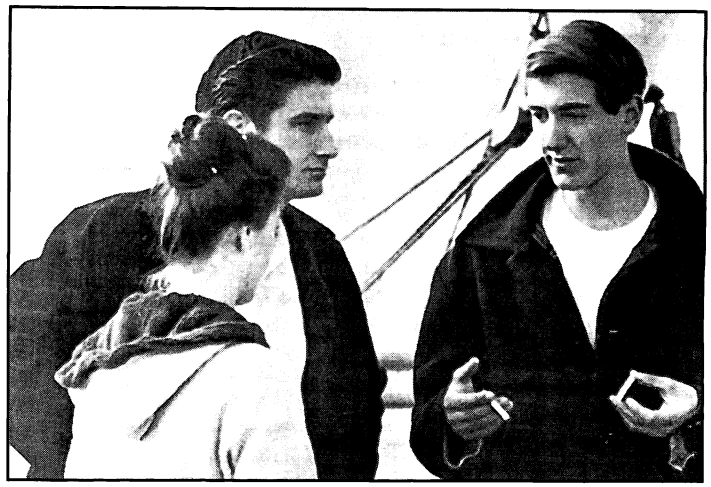
to Dr. Bühlman. He tried to assist Small per Bühlman's instructions but Small was too far gone to be saved at that point. The EUREKA was now moving full speed towards the Navy Hospital with recompression chambers in Long Beach. Once in Long Beach Harbor the *Atlantis* was lifted off the EUREKA and Keller and Small pulled from within the *Atlantis* and rushed into the hospital chamber. Keller survived with no ill effects having proved his system that shortened decompression time, much of which was put to use in the ensuing decades for oil exploration.

I'm not entirely sure of how far reaching Keller's work actually was for sport diving or even commercial diving. To many it was a challenge to see how deep you can go, how far you can stretch the limits. To others it was just another stunt that had no effect on the sport. What did I learn? There are a lot of pathetic people out there who negatively exploit the brave risk takers who blaze trails so they can pretend they were part of something.

I liked, Keller, Small, Whittaker and Anderson. For me they were diving pioneers and heroes. They are that human spirit that will not let us stand still and just be satisfied with what is. There's an old saying I first saw in the Musician's Union in Hollywood that said, "I hate the guys who criticize the guys whose enterprise has made them rise above the guys who criticize."

NOTE: A more complete account of events surrounding the dive can be found in chapter seven of Al Tillman's book I Thought I Saw Atlantis, *from which the above is excerpted.*

Chapter 4
Chris Whittaker is remembered in a letter from Dick Anderson



Dick Anderson (left) and Chris Whittaker (right) talk with Skin Diver *magazine's Connie Johnson prior to dressing in as safety divers.*

Photo: Bob Johnson

On December 3, 1962 I was a safety diver when Hannes Keller made his 1,000-foot dive off Avalon, Catalina Island. Moments before his descent in the bell he borrowed my dive-knife, for whatever reason. (It could have cost him his life!) Keller and British newsman Peter Small began their descent. At 1,000 feet Keller opened the bottom hatch of the diving bell, swam down and planted his US and Swiss flags in the bottom at 1,020 feet, with Peter Small waiting in the bell.

Keller returned to the bell and closed the hatch. Peter Small was losing consciousness. Keller signaled to raise the bell. Then both Keller and Small were out cold.

The bell was stopped at 80 meters on the way up. The bell was not maintaining pressure. Al Tillman, who was ram-rodding the operation told me and safety diver Chris Whittaker, who was aged about 20 or so, to drop down and close the external vent-valves and check to see that the bottom hatch was closed. Whittaker, a close friend of Peter Small, and I jumped in and headed down. When we got to the bell at 80 meters we closed the external vent-valves and checked the bottom hatch. It was closed. We surfaced and boarded the support boat. Moments later Tillman reported that the bell was still not holding pressure. He wanted us to re-check the closed valves. I jumped in to make my descent. Everybody yelled "Wait for Whittaker!"

On the first ascent Whittaker had inflated his safety-vest for some reason. It didn't have a vent so he pulled out his knife and cut a hole in his safety vest so he could descend.

Chris Whittaker.

Photo: Triton *magazine*

At 80 meters we re-checked the external valves: they were closed. Both Keller and Small were lying unconscious on the bottom of the bell. I rechecked the hatch. It was closed but leaking gas. Something was keeping it from making a seal. I could not lift the hatch. There were two bodies laying on it. I stuck my head up into the concave hatch. There was something thin preventing the sealing gasket from seating, perhaps a fin tip. I needed a knife to shove the obstruction out of the way, but Keller had my knife.

I signaled Whittaker to give me his knife. For some British-diver-reason he had it tethered off with a heavy 3 foot cord. He cut the cord and handed me the knife. I shoved the blade under the hatch and pushed the obstruction out of the way. The hatch plunked down, but it was still leaking — probably from an indentation in the hatch gasket. But it stopped leaking when I pulled the hatch down.

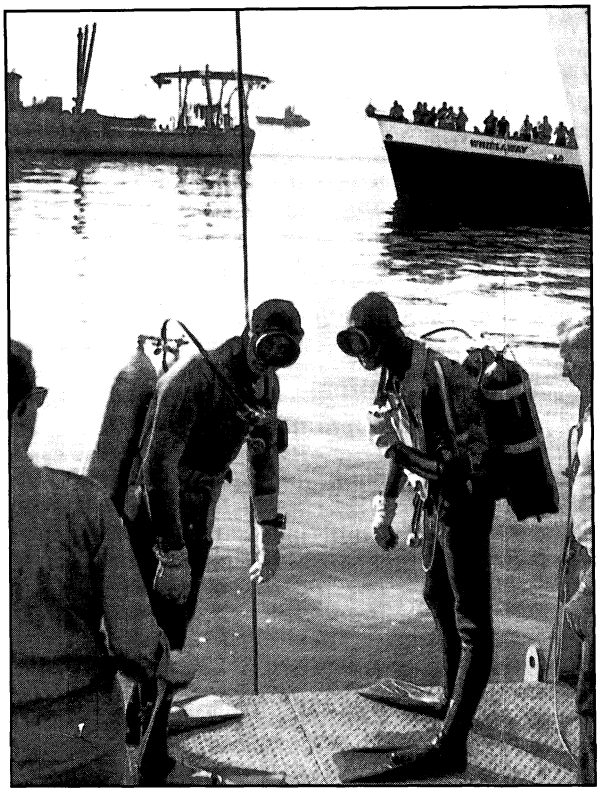
I signaled for Whittaker to surface and have them raise the bell while I held the hatch. A pressure differential would seal the hatch. Whittaker signaled that he got the message and started up. (There is no way I would have had him hold the hatch while I surfaced.) A few minutes ticked by. Pressure in the bell was building. The hatch quit leaking.

My decompression meter was creeping into the Red Zone so I began my ascent. The moment I broke the surface I was met by the yells "Where's Whittaker!" It had been several minutes since he had started up. The water visibility was close to 100 feet and he just wasn't there. It was a devastating moment.

In conclusion, if Whittaker hadn't made that second dive with me, and given me his knife to clear the obstruction, Keller would have probably died along with the unfortunate Peter Small.

Chris Whittaker was a hero but hardly anyone took note of it.

Dick Anderson
Bell Canyon
California, USA
March 2002



Dick Anderson and Chris Whittaker
Photo by Paul Tzimoulis

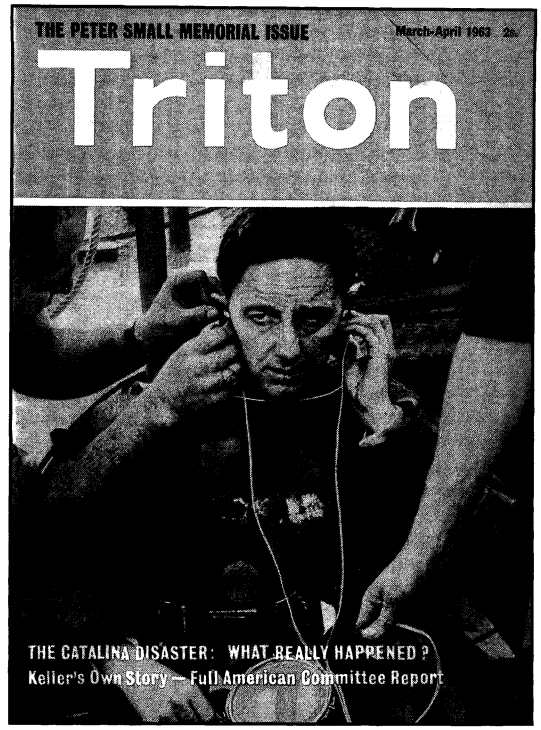
Chapter 5
U.S. Findings on the Fatal Dive

On Monday, December 3, 1962, during an experimental deep sea diving operation attempting a depth record from the scientific research vessel EUREKA, in the San Pedro Channel, approximately 2 miles north-east from Avalon, Catalina Island, a mixed-gas artificial atmosphere equipped diving chamber installed with lights, cameras, TV scanners and communications system, was lowered to a depth of 1,015 feet in the sea.

In the diving chamber were Hannes Keller, a Swiss national, director of the dive and compounder of the secret mixture of gases being used, and Peter Small, a British subject, commissioned to write a magazine article about the diving experiment.

During this diving operation, Peter Small died in the chamber; and Christopher Duncan Whittaker, a British national student at UCLA, is missing and presumed dead. Hannes Keller emerged in good physical condition from the chamber - the first man successfully to achieve a 1,000 feet wet dive in the open sea.

This outstanding diving achievement has been marred by the fact that two men died during a dangerous diving experiment. The subsequent conflicting statements made by Hannes Keller and his operational staff, apparently to protect the achievement and to hide or redirect facts concerning the cause of Peter Small's death, coupled with the highly technical operation, suggested errors in procedures that could not be ignored, nor could explain the facts to the satisfaction of the Sheriff's Department and the Chief Medical Examiner-Coroner, Los Angeles County.



The March-April 1963 issue of Triton *was the Peter Small Memorial Issue. Small was the co-founder of the British Sub Aqua Club.*

In order to clarify these clouded issues and resolve the facts involved, the Chief Medical Examiner-Coroner appointed and deputized a fact-finding committee to investigate and report their conclusions about the above diving accidents.

The Committee interrogated many witnesses, examined still and moving pictures, tape recordings, and pertinent factual information connected with the diving accidents. Based on this extensive examination, the Committee makes the following report:

According to statements by Mr. Keller, both divers were subject to the same environment during the 1,000-feet dive, with only minor variations for a short period of time in the composition of the gases breathed. When an apparent deficiency occurred in the deep dive gas mixture, Keller removed both his and Peter Small's face masks. Both lost consciousness. Keller recovered in thirty minutes; Small regained consciousness approximately ninety minutes after Keller.

We find Keller's statement is in direct contradiction to an opinion in his report submitted by Dr. Bühlmann, medical officer during the dive. Dr. Bühlmann believes it highly probable that Peter Small remained at least thirty minutes on his re-breather equipment and states, "During this time he was using the limited amount of 02 of his semi-open system and was getting more and more hypoxic, finally developing serious anoxia."

In this case the environment would certainly have been very different for the two divers.

All testimony agrees to the fact that Hannes Keller was unconscious for one half hour and Peter Small remained unconscious for two hours. The decompression schedule used for both Keller and Small was much more rapid than would have been acceptable under standard navy decompression procedures as practiced in this country and which is essentially uniformly the same throughout the navies of the world.

According to the autopsy, with the exception of serious gas embolism, Peter Small's condition was physically sound. In particular, there was no evidence of coronary occlusions nor cardiac diseases.

The Committee is in agreement with the conclusion by Dr. Bühlmann "that Peter Small's circulation was seriously impaired through possible prolonged anoxia with loss of consciousness. Therefore, he was not able to eliminate adequately the nitrogen from his body and so developed the symptoms of decompression illness — the bends."

It is the opinion of this Committee that Peter Small should have been additionally recompressed at the period when he showed increasing distress to see if his symptoms could be relieved in any way. If this relief had been obtained, it is possible he might have survived.

Regarding the disappearance of Christopher Duncan Whittaker, the following conclusions are reached:

Based upon available testimony, the Committee has not been able to determine how well Whittaker had been trained as a SCUBA diver. Inquiry failed to establish his previous experience and competence for deep diving. It is our opinion that Whittaker was not a qualified deep diver and should not have been authorized as a Safety Diver on this venture. It is not clearly understood why he was chosen while personnel with vastly superior experience were available and had been enlisted for this operation by Hannes Keller within the week before the dive. On the day of the dive these persons were rejected in favor of Whittaker and Anderson, yet later had to be called to assist in the emergency situation which developed.

In light of the joint experience of the Committee it is our opinion that Whittaker was overweighted and had to

resort to inflating his life vest to make the surface from his first dive. Not having this flotation aid on his second dive, having slashed it with his knife, the exertion to regain the surface is believed to have caused anoxia (shallow water blackout) resulting in unconsciousness during which time the weight of his equipment carried him to an unrecoverable depth.

The testimony shows that Whittaker was strongly advised not to make the second dive. In disregarding this advice, the Committee is regretfully forced to conclude that he is responsible for his own death, and no immediate responsibility can be put on anybody else.

In analyzing the reasons for the accidents, the Committee has two different philosophies of approach to consider: 1. The well-established American Diving Safety Standards prescribed and adhered to by divers in the United States: and 2. With no intention of being critical, the European diving procedures which appear not to carry the same margin of safety by comparison.

We recognize that unexpected circumstances prevailed during the dive; human stress, emotional conflict, misunderstandings and breakdown or disruption of command were involved in a series of mishaps resulting in two fatal accidents.

In several areas considered, the only evidence is the statement of Hannes Keller and in view of no substantiated evidence to the contrary we must accept his word as fact. We find so many missing links in the Peter Small tragedy that it leads this Committee to feel there are doubts as to the sound judgment of some persons involved. However, under duress, obvious in this situation, errors must be considered as unfortunate but not condemning. We are undecided as to whether or not Hannes Keller, by making his several conflicting statements, is merely confused as to actually what happened down there or is evading issues to protect his interests. In the course of our questioning the witnesses, many suppositions were advanced to explain this behavior - most probable: individual interpretations attempted to preserve a hero image about Keller and his achievement, and defended that image by making light of a series of unfortunate decisions that resulted in the tragedies. The Committee feels, however, that this can well be interpreted as a natural human response under the circumstances.

A complexity of pressure groups — magazine commitments; public announcements; Navy contract; borrowed items, including ships and closed circuit TV; time table; weather factors; limited time of individuals involved; expectant creditors — pushed the entire experiment to the edge of chance. Under this pressure, it appears that insufficient consideration was given to the possibility of adverse development or mishap. Previ-

Hannes Keller

Photo: Paul Tzimoulis

ous successes advanced this state of optimism. Success had followed success in all of Keller's dives. Peter Small trusted Keller's ability without question. Keller indicates he had sold valuable possessions and had gone into debt to finance this experiment. The desire to complete this much publicized dive, even when he admits his gas supply line had a leak in it before leaving the surface, indicates another pressure factor that compounds an error.

We feel adequate pre-dive check of the diving chamber and related equipment was made by supervisors and by Keller personally but apparently there was not sufficient consideration given to possible human failures.

It is not necessary to discuss the many areas of variance which are a matter of official record but it should suffice in summation to indicate that no cause is evident to indicate criminal negligence occurred.

The arrangements for the American safety divers was entrusted by Hannes Keller in good faith and confidence to the local American coordinators of this diving project. It is regrettable that they let Hannes Keller down and his remarkable dive is now tarnished with a death entirely unrelated to his original program. This Committee cannot condone the obvious violations of diving safety that compounded this accident, especially in view of the fact that sufficient entirely capable divers were available for this dive. Evidence shows serious and regrettable judgment in one selection resulting in the loss of Christopher Whittaker. In contrast, the selection of the other safety diver, Richard Anderson, was justified and most fortunate in that we feel Hannes Keller owes his life to the unusual ability and courage of this one man.

Observations:

The intense desire to complete this much-publicized record dive as scheduled; the blind admiration for Keller

and his theory of mystery gases (one enthusiastic witness acclaimed, "In this one dive, Hannes Keller has advanced diving ten years!"); the desire of many to ride to glory on his repeated success created an abnormal atmosphere coloring sober judgment. We find the whole experiment was fraught with potential hazards, yet withal, it produced a significant scientific achievement that regrettably erupted in a tragedy that has saddened the world-wide diving fraternity.

Respectfully submitted.
JOHN D. CRAIG,
Lt.-Col., USAF (retired).
B. K. HASTINGS, M.D.,
Comdr., U.S. Navy.
MORGAN C. DEGN,
Sr. Aquatics Specialist.
HANS BISCHEL, PH.D.,
Univ. of Southern California.
LESLIE THOMPSON,
Lt.-Comdr., U.S. Navy.

Reprinted from Triton, *March - April 1963*

Chapter 6

The Mistakes at Catalina -Keller

Two wrong decisions, which contributed to the death of Peter Small, were made during the 1,000 foot dive off Catalina Island in December, Hannes Keller stated in London recently.

The first came when he discovered that a tank containing his special mixture was at half pressure, showing 80 ats. instead of 150. The dive should not have been continued, but it was.

The second mistake was to drop the U.S. and Swiss flags on to the ocean floor when the diving chamber *Atlantis* reached the record depth of 1,020 feet. In the circumstances, this should never have been attempted.

Since the dive and his testimony to the American fact-finding committee, Hannes Keller has changed his mind about one other vital point. He now believes that Peter Small did not open his face mask. When the two lost consciousness, he would therefore have been without oxygen for 20 or 30 minutes and probably died from anoxia as a result of this.

These views were given by Keller to a group of diving experts and other interested parties in London in January (1963). They included Colin MacLeod, Chairman of the B.S-A.C.; Oscar Gugen, Vice President; Sgn.-Capt. Stanley Miles, Director of the Royal Naval Medical School: Sgn.-Lt. Tony Jarrett, R.A.F. Institute of Aviation Medicine; Jack Atkinson, B.S-A.C.; Cdr. R. Harland, ex Supt. of Diving, R.N. and Normalair; Mary Small and Bernard Eaton.

Keller described the preliminary dive that he and Peter Small made at Catalina. They spent an hour at 300 feet, he said, and Peter seemed all right. Later, however, he developed a very dubious symptom of bend in his knee but he nevertheless spent four-and-a-half hours in a decompression chamber. Following this, they decided to go ahead with the dive two days later.

Four tanks supplied mixtures to the *Atlantis*. Tank I was intended to take the two from 250 feet to 1,000 feet, and back to 500; Tank II from 500 to 300; and Tank III from 300 to 130. Tank IV was in reserve.

Keller stated that it was during the early stages of the final dive that he noticed Tank I was at half pressure, showing 80 ats. instead of 150. There seemed to be no leak. The two were using semi-closed breathing sets with tanks of 3-litre volume, and their reserve at 1,000 feet would be reduced to four minutes from 10 or 12. Should they therefore carry on the dive and keep refilling their bottles, or not? The conclusion was reached that they could keep on refilling, but that instead of staying at 1,000 feet for five minutes, as originally planned, bottom time would be cut to three minutes. This decision seemed right but was wrong, and probably caused Peter Small's death, he continued.

The dive itself then began, he said. At 250 feet the two plugged in their mouthpieces and began to breathe the special mixture; then descended fast to 1,000 feet. On the way down, they both refilled. They did not do so again.

At the bottom, the hatch was opened. This took 20 to 30 seconds. Mud obscured the flag-dropping operation, which Keller carried out himself, leaving Peter Small inside. Then the flags got tangled with the air hoses and covered Keller's face mask. Probably one-and-a-half to two minutes were lost in this way, and when he climbed back into the chamber he was a bit exhausted. He was also slightly dizzy, and felt some fear.

Many times since then, he said, he had tried to reconstruct what happened next. He should have refilled the apparatus they were using, but possibly decided to close the hatch first. The attempt to do this was made and the flipper got caught.

There were, he thought, only two possibilities in the circumstances. One was to plug in and refill. The other was to treat the matter as an emergency, to open the gas valves, blow the water out — to prevent them drowning whilst unconscious — and to open their face masks and take off their mouthpieces. Peter had been instructed to do this, should such an emergency arise. He took the latter course. The TV monitors showed Keller disappearing,

and Peter was seen to rock slowly for about two minutes, then he fell down.

Keller says he was unconscious for half an hour. He suffered from oxygen hallucinations. Peter was still lying there. He cut Peter's helmet away, but does not remember whether or not the face mask and mouthpiece were there. He later had the idea that the face mask was open, but came to this conclusion largely because he thought that otherwise Peter would never have recovered consciousness. He therefore told the coroner that the face mask was open.

Since then, however, he had come to the conclusion that this was wrong. In a subsequent discussion with Dr. Bühlman, he discovered that it is possible to have anoxia, to recover for half an hour, then have a relapse. Keller said he was astonished when Bühlman told him there are cases where people have no oxygen for 20 or 30 minutes, temporarily recover, then die.

Anyway, Peter's pulse rate was low and his breathing shallow. He recovered consciousness after an hour-and-a-half or more, began to speak then more and more appeared normal. He was extremely exhausted, tried to stand, but couldn't. He was given a drink, and was suffering from the heat, so Keller cut away his suit and underwear. He checked his body, and everything seemed all right. He pinched him, and Peter reacted. He was in communication with Dr. Bühlman, and finally reported that everything seemed "Fine-O.K."

Decompression went on for six hours, and Peter began to sleep. He kept changing position. He was extremely uncomfortable and nervous, says Keller. "Dr. Bühlman asked me to check Peter again, but I refused because he was asleep."

The bell was by this time on the pier, laid down. Keller changed Peter's position, then noticed he was not breathing. He gave mouth-to-mouth respiration and, finally, orders to release pressure. Peter was probably already dead.

Two other things had since happened which led him to believe he was wrong about Peter's face mask being open. Firstly, one man present when Peter was taken from the chamber stated that he had cut his face mask off, and it was then closed. Secondly, another man had said there was foam inside the mask, which was indicative of anoxia.

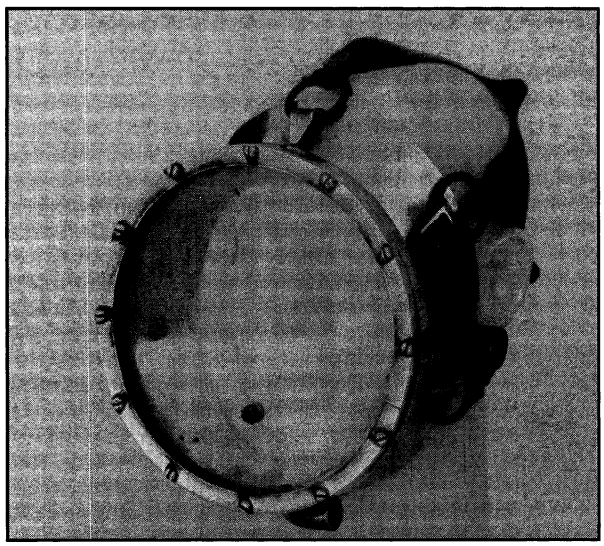
In this event, concluded Keller, there would have been no possible chance of saving him at any time.

Reprinted from Triton, March-April 1963

A History of Kirby Morgan Diving Equipment
by Bev Morgan and Bob Kirby
in association with Leslie Leaney
Part Two
Kirby Morgan Diving Masks

As noted in Part One of this story, both Kirby and Morgan had manufactured masks prior to the start of their partnership in 1965. Although this article is primarily about the products the partnership and later company manufactured, I feel it is important to trace the origins of their masks back as far as is possible. As we still have access to both the partners, I have included much more background on their earlier masks than was originally planned for the article. Parts of the article are based on Morgan's history of the company and mask model numbers were assigned retroactively by Morgan, for ease of reference. Kirby refers to his book, Hard Hat Divers Wear Dresses, *which was being printed during September and October 2002 and should provide more details on his overall career. Both men were interviewed separately in California in August and September 2002.*

Leslie Leaney



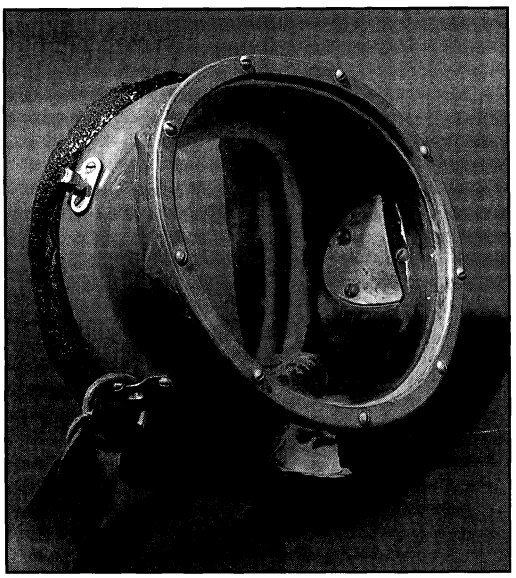
Kirby #1 Mask Prototype
Made on the U.S.S. NEREUS, *1955*

Bob Kirby, 1955: In the early 1950s I was a navy diver on the sub tender [U.S.S.] NEREUS in San Diego, but was restless. I started living a double life and was living on a fishing boat part of the time and on the NEREUS the rest. I started diving commercially in my off duty hours and hooked up with Lad [Handelman] in 1955. I was introduced to him by Jerry Todd down in San Diego, and the story of how I met Todd is in my book that is coming out soon. [Kirby's book, *Hard Hat Divers Wear Dresses*, is distributed solely by the HDS-USA and is scheduled to be available in January 2003. Details will appear at www.hds.org and in the next issue of Historical Diver. - Ed.] Lad was diving abalone with a guy called Rex Rosenberry and they were using Widolf masks. Now these were not the fancy oblong Widolfs with nice face seals that turned up later. No, these were the old circular ones which were always interesting to dive. The brass ones would sink and the aluminum ones would float. Rex had terrible eyesight and could not wear glasses inside the Widolf. He and Lad let me dive one of their Widolfs and, like them, I got just a terrible pain from how tight the damn thing was. It was a gruesome experience. I had met a Navy ship yard welder called Henry Hanson who dove a bit with Chuck Snell part time. Henry was pretty unique as he was a black guy, and there were not many black divers around those days. Henry did not like the Widolf's at all and made several of his own style of masks from stainless steel. These were an absolute work of art. Marvelous! So I designed my mask after Henry's. Like him I constructed mine of stainless steel and made a few changes by trial and error. This was my first mask and it worked just great. It got me started on making dive gear. It is now on display at the Santa Barbara Maritime Museum.

Bob Kirby:

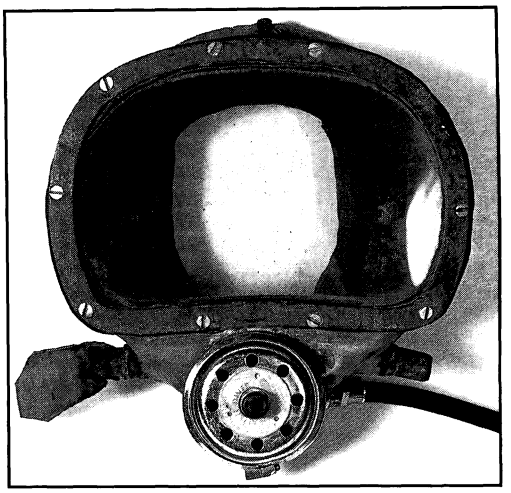
Masks 1955-6. During this time I discovered a material called monell. It welded together well using a torch and I made a mask out of it. I was living on a fishing boat called the LAURA BELLE which was owned by Steve Rebuck's father, George. Moored near us was a boat that Bob Ratcliffe was living on and we got to know each other. Ratcliffe had an air compressor on board and when he had to go in the Navy I sort of talked and traded him out of it. I needed a good compressor as sometimes we were diving with 300 foot of hose out. This compressor trade sort of made Bob and I a loose partnership, but it was so long ago that I am kind of foggy in the details. Bob [Ratcliffe] might remember all this better than I do. Anyway, I ended up putting a homemade regulator on the side of my new monell mask, much like the Scott and Desco masks. It breathed great at the surface but at 60 feet I was dying. So I figured out that if you could adjust the tension on the inlet valve spring it would breathe easier and

designed a spring tension device that eventually became the Dial-A-Breath. There is more about this in my book. I toyed with the idea of going into production on these masks but then the Navy went to sea and took me with them. There was not enough monell on board to make a run of masks but there was a ton of steel, so during the course of the voyage I made 10 masks in steel. I ended up giving them to Ratcliffe who had them hot dipped galvanized to stop them from rusting up. We started marketing them to divers and I believe we sold a couple to a marine hardware store up in Morro Bay. Ratcliffe might remember more. I got out of the Navy in 1956 and started ab diving full time.



1960. MMX-1. The Morgan Mask Experimental 1

Bev Morgan: I was ab diving out of Newport Beach with Jimmy Maag's Newport fleet. I was hanging out with Pat Curren who was diving abs with the fleet. Curren and I had struck up a friendship and were making surfboards when we were ashore between ab trips. Some folks from the San Diego Aquarium, Sea World, came to see us. They had women divers there using the Ram Engineering old style Widolf masks and they wanted a mask with a larger viewport so the audience could see the girls' faces better. Curren and I made a mold and turned out a couple of masks. Sea World passed on them so we ended up making a couple more and selling them to ab divers. The masks were free-flow like the Widolf's and Ram's, but were made of fiberglass with brass fittings. Air was supplied through a non-return valve at whatever flow the compressor was set to make. It didn't take long to learn what RPM to run the compressor for the depth the diver was diving. I recall we only made four of these masks.



1960-61. MMX-2.
The Morgan Mask, Experimental 2.

Morgan: We were always trying to figure out ways we could fit more abs on the boat to make more money. As a way of lightening the boat we experimented with putting a Sportsways demand regulator on an MMX-1 mask and tried using a smaller and lighter compressor to feed it. It worked! We only made two of these using the MMX-1 as a starting point. These were fiberglass with brass fittings and there was no side block. Right at this time I quit ab diving and went off to edit *Surfer* magazine. I still did the odd ab run but I was kinda out of the business.

1964. MM-3. Morgan Mask 3.

This was the first of the masks that had a side block and a demand regulator. The positioning of the side block and regulator set the standards for future masks and helmets. A non adjustable Scubapro demand regulator was used. Twenty of these masks were made and sold to Ocean Systems in 1964.

Morgan: When I was diving ab I sold my catch to Danny Wilson in Santa Barbara but the money was not always

there, so I had to wait around for it sometimes. So one time I went to see Wilson about getting paid for my catch and found out that he was starting a company to service the oil diving business. I told him I'd be interested in getting a job with the company and he said "I'll tell you what. If you can keep up with me shot for shot I'll give you a job," and he puts a fifth of vodka and two glasses on the table. I knew he was a sharp guy and he probably figured that during the [drinking] match I'd forget about the money I came up to get from him. "Ok," I said, "Let's do it!" I followed him shot for shot and when the bottle was empty we were both still standing and I had a job. Then I just kinda passed out and woke up with my head in his toilet and his wife trying to clean me up while he was laughing outside the door. I started working on the *Purisima*. [The *Purisima* is considered the first American lock-out diving bell. See *Purisima*. "Forerunner of Today's Modern Diving Bell," by Hugh "Dan" Wilson, HDM issue No. 1, Summer 1993, Ed.] Somewhere near completion of the bell, someone walks into the shop with a standard Jap hat breastplate and tries to fit it through the bell hatch. And it won't go. They built the hatch too small! They figure that they can't change hatches so we had a meeting and I volunteered to make a fiberglass mask that we could maybe use in the bell instead of Jap heavy gear. Then they figure out that we don't have time to build a new mask so Ramsey [Parks] and I introduced Widolf's with regulators on them. I shot some pictures of them underwater around the bell. Within about a month Wilson decides to take me up on my offer to make the fiberglass masks and orders me to make 20 masks. [Bob] Ratcliffe and [Bob] Christensen helped make them as employees of Ocean Systems. Well, I figured that Wilson would only pay me my usual hourly wage for coming up with these masks so, although we built them on Ocean Systems time, I had Pat Curren bill Wilson for the mold and shells so they appeared to be built by an outside contractor. Wilson never did figure it out and a few years back I decided to tell him what really happened and he was not the happiest I'd seen him. But, hey! I'd never have made any money out of the deal any other way with Wilson.

There is also another story on this mask. I had Agonic Machine shop make the side block and valve for the Scubapro first stage for it. They got very interested in the mask and a couple of years later I was in their shop and I saw that they had made some molds off it. They had decided to go into the manufacturing business as General Aquadyne, basically utilizing my designs and my trade secrets to get into the helmet and mask business. Take a look at this mask and the early Aquadynes and you'll see exactly what I mean. In those days I didn't figure there was much I could do about it. So off they went. Today, it's a very different story. I'd rather spend every last dime in this company paying my attorneys than have anyone take unfair advantage of my work which I now have over 50 years invested in. And you know I'm not joking. Just ask around. It's not a child's game.

Kirby Morgan
1965. KMAM-4. Kirby Morgan Air Mask 4.

This was the first mask Kirby and Morgan built as partners. These were a simple steady flow mask for commercial divers. Nine were made.

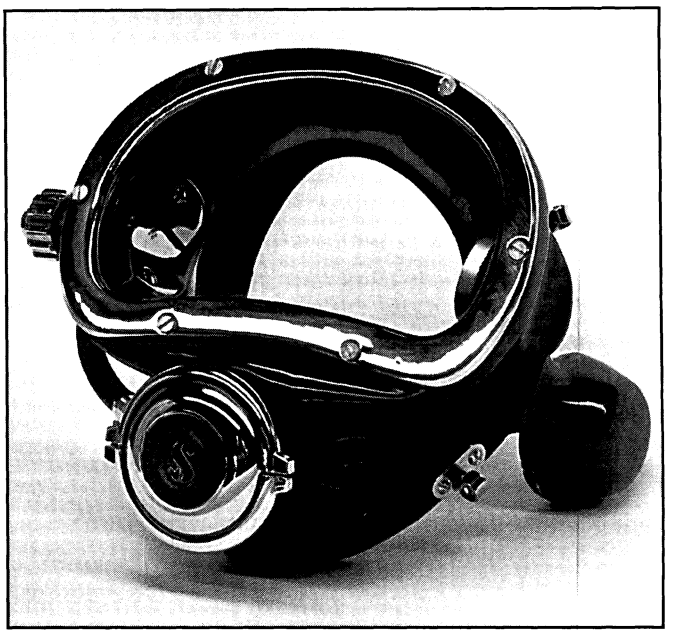
Kirby: This was our first mask together. I had just finished the four helium recirculators for Blackie [Murray Black] and I knew about the mask Bev had built for Danny Wilson [MM-3]. Bev and I joined forces and we worked on these masks at the same time we were building the next order of recirculators. Bev designed the mold and directed this whole project. He did all the fiberglass and I did all the metal. But this mask has a scary story with it. Boy, what a traumatic day we had with this. [See Kirby II below.]

Morgan: We had just gotten together and Kirby wanted to make a small free flow mask, smaller version of the first mask [MM-1]. I told him it would not sell. It was free flow and having a regulator was now important. Plus comms was important, too. On a demand mask you hold your breath and hear the comms. On free flow it was a lot harder. The guys in the Gulf [of Mexico] wanted the comms. Kirby wanted to make this in the worst way so we so ended up making it. We only made a handful but the experience was not wasted. These little masks were the start of the trail to the Band Mask. And then there's this whole nightmare story that comes with it. [See Morgan II below].

Kirby II: A diver named Walt Swanson was using one of these [masks] and got cut off. [The air supply to the diver had ceased. Ed.] out at the [Santa Barbara Channel] Is-

lands and his face almost got sucked into his air hose. To escape he smashed the face plate with his ab iron, which relieved the underpressure, and began climbing his hose to the surface. When he got there his tender saw that both his eyeballs had been sucked out of their sockets and were laying on his cheeks! The tender drags him on board and places wet gunny sacks over his face to keep the eye balls moist and then heads back to harbor. Some doctor rushes down to the boat and using his thumbs, pushes both the eye balls back into their sockets and says "That's all I can do for you fellah." Walt had a reputation as a fighter and came over to the shop and, luckily for me, wanted to get into it with Bev. Now nobody backs Bev down so it looked like it was gonna get ugly. [In this interview Kirby completed the story, but to avoid duplication Morgan takes it up from here. Ed.]

Morgan II . One day a car pulls up outside the workshop. A woman gets out of the driver's side, goes round, opens the passenger door, and helps a guy get to his feet. Once the guy is standing she leads him by the hand towards the shop. He has two large patches over each of his eyes and is trying to feel his way forward. The woman gets him into the shop and the guy starts yelling "You lousy mother fxxxxx's! Your face seal works too good and your one-way [non-return] valve isn't worth a sxxx! Your lousy mask sucked my fxxxxxg eyeballs out!!!!" The guy was raving. Then he removed both the patches and his whole face around his eyes was black and blue and his eye sockets were so bloody that I thought blood was going to gush out. There were burst veins and blue and brown lines. It was like looking at a horror movie. We were just frozen in shock at what this guy looked like. We'd never seen anyone with a squeeze before and this guy had had a mask squeeze and looked like he was dead. And then his wife starts screaming at us that we nearly killed her husband and ranting on. He wanted to get into a fight but before we started I reasoned with him that we should take a look at the mask first, then get into it. He had the mask with him so once he calmed down a little I took the mask off him and went to the bench to inspect it. The first thing I checked was the non-return valve. The guy was [with the] Black Fleet who worked a three man crew and I said to him "You just got a new operator didn't you?" and he says "Yes." "And before this happened you'd been cut-off hadn't you? "Yes." "And then you got cut off again and this happened didn't it? "Yes. How do you know all that stuff?" And I said "Because when you first got cut off your operator never fixed [trimmed] your air hose correctly and he didn't blow it out after fixing it either. When he reattached it to the mask a small strand of fabric and rubber got blown into the one way valve. When you got cut off the second time that strand jammed the non-return open and almost sucked your face off. And how do I know that? Because your hose fabric is still in this valve, and I don't care how fxxxxd up your eyes are, I want you and your wife to come here and take a look for yourself." Well, the guy had to pry his eye lids open and this bloody red eye squinted out and his wife was looking too and that sort of convinced them it was not our fault. But his face was such a scary sight. The shock of that incident alone led me to develop a better one way valve for future masks.

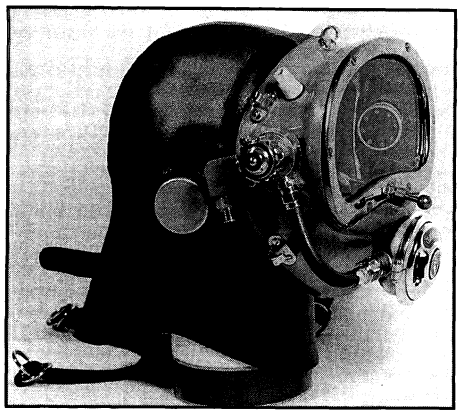


1965. KMM-5. Kirby Morgan Mask 5

Later in 1965 Kirby Morgan manufactured a fiberglass mask that was equipped with a steady flow valve and demand regulator. It had a rigid earphone on one side and used a Scubapro demand regulator with no adjustment. Kirby thinks only one or two were made, while Morgan recalls approximately six.

Kirby: I really didn't do anything on this mask. It was pretty much Bev's design, but I do recall that it breathed hard. I can remember Bev coming out of the water offshore and saying that it was hard breathing.

Morgan: While we were making the KMM-4 we started tooling up for this demand mask. The mask in the photo uses a Scubapro regulator but we switched to the U.S. Divers Conshelf as they were easier to install the Dial-A-Breath system in. We were doing these at the same time we were building the SemiLite helmet and it is easy to see the many similarities in the mask and the helmet. Both had glued in face seals. Our style was now pretty much me handling all the masks and Kirby handling all the helmets.

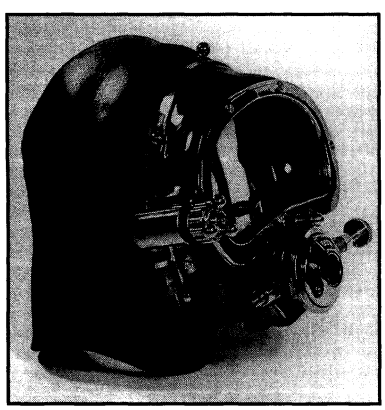


1966. KMM-6. Kirby Morgan Mask 6

The first production mask with a hood attached. It had two ear phones in the hood which were protected by metal cups and hearing was greatly improved. All masks up to this one had glued in face cushion/seals. A U.S. divers demand regulator was used on this mask. Approximately 10 were made.

Kirby: I recall that the original had a Scubapro regulator in it. We changed from a Scubapro regulator to the U.S. Divers because it was easier to modify that Conshelf regulator to accept the adjustable Dial-A-Breath. I took a Conshelf 12 and my sketches to Agonic [Machine shop] and explained that I had to have components machined that would serve a function. They had a certain amount of engineering involved in the design. I think we made about seven of these with the hood glued on and then Bev came up with the idea of putting a zipper in the hood.

Morgan: This was important because the exhaust bubbles now flowed outside the hood so hearing was improved. Plus we had two ear phones instead of one. We still had a Victor welding valve as the air flow control knob which was a carry-over from the MM-3. The spider was still attached by metal rings.



1967 KMB-7. Kirby Morgan Band Mask 7

The two earphones were placed in pockets inside the hood for easier replacement. A new face seal was introduced and the company started to make its own regulators that were adjustable by the diver when in use.

Kirby. This was the first of our masks to use the band. I designed and made the band and the retaining balls. Dick Quitner made all the side blocks for them. We used the U.S. Divers Conshelf 12 regulators, modified with our Dial-a-Breath, for years, until 1977. Then we made the entire regulator. The most dramatic part of this mask was that the face seal was stretched across like a trampoline with a hole for your face to fit through. That was all Bev's design.

Morgan. After seeing the guy with the face squeeze, I decided to work on a different sort of face seal. We made a hood/face seal that was removable with a simple two screw band. The band also allowed the hood and face seal to be removed and replaced without any gluing in the mask. The adjustable demand regulator proved to be an important step. Unlike a scuba air supply, compressors that supply commercial divers air through the hose vary widely on output pressure during a dive as they cycle on and off. That, combined with the diver working at different depths, required an adjustable regulator to properly meet the needs of the surface supplied diver. The adjustable regulator has been on all our masks and helmets that have a demand regulator.

About this time [1967-1968] we had many VIP visitors come to our little shop at the Santa Barbara Airport. The shop was right on the tarmac at the airport and Kirby kept his airplane just outside the door. Many of the days we just closed up shop and went flying. Scott Carpenter, the Astronaut/Aquanaut, was with the SEALAB program and was a frequent visitor. People from General Electric, Westinghouse, Union Carbide, many foreign navies, as well as the U.S. Navy came calling to see the new diving equipment we were making. Some visitors like Scubapro, U.S. Divers [now Aqua Lung], and Dacor wanted to buy us out. Kirby and I called it the era of the "Big Buyout." To listen to these buyout offers one would think that all we had to do was sell out and be rich and famous. I kept telling Kirby that "There's no free lunch!" and he agreed. Each of the big buyout offers turned into window dressing for the stark reality of the "ball and chain" work contracts that were proposed for Kirby and me after the initial courtship. We saw that there would be no independent thinking of design in our future if we signed up for the big buyout.

I could tell you a hundred big buyout stories and probably will some day. But one person we talked with had a story worth telling. Gustav Dalla Valle of Scuba Pro was one of the real slickers. He was from Italy originally. He showed little interest in our adjustable regulator but borrowed one anyway just to have a look. Within two years,

Scuba Pro was manufacturing an adjustable regulator identical to ours. But that is water under the bridge. I liked Gustav, especially after he had a few glasses of wine. Which was the situation I found myself in one day on Catalina Island.

I had moored my abalone boat in the harbor at Avalon and was sitting on the sea walk wall in town. This was one of the ab diver's favorite shore duties when in Avalon. Every girl on the island walked by within a couple hours. Kinda like shopping for the evening. Gustav walked up and invited me to lunch. We went up to his fancy hotel room and he had a big lunch brought in. A big lunch to Italians, at least that Italian, was tons of fruit and cheese along with a few bottles of heavy red wine. The telephone rang and Gustav started talking. His voice rose as some unpleasant information was related to him. It seems that a competitor had beat him out on some large sale of diving equipment. He was really mad. His heavy Italian accent became almost impossible to understand. "That Sona-ofa-Beecha!" he yelled, with his face reddening. "I-aa shouldaa killedaa heem-a wheen-a Ia cooudd-aa!"

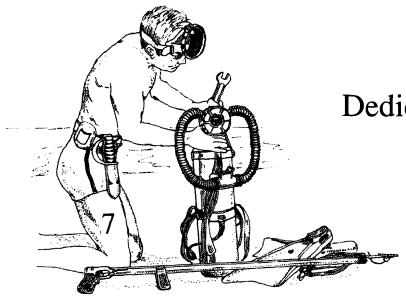
It took a few more gulps of wine and comments such as, "Ia'm gon-a pissa ona hisa grava soma day, yo-aa see-a," before finally I got the story out of him, and you can print it for what it's worth if you want.

Gustav was with the Italian undersea forces [frogmen] during World War II. The Germans, who were occupying France at that time, had caught a Frenchman swimming about underwater with a breathing device in the South of France. Gustav was with a group of Italian divers supposedly salvaging a ship across from Gibraltar, but that's another story. Anyway, the Germans had the Italian divers come and look at the Frenchman's underwater breathing device to help them make up their minds on what to do with him. Killing him was probably an option.

"Hell-aa, I-aa look-aa att-aa the device-aa and told-aa the damn Germans that-aa it-aa was a useless-aa thing because-aa it-aa give off-aa bigga bunches of-aa bubbles. They-aa ask-aa me what-aa to do-aa with-aa the Frenchman and I-aa told-aa them he was-aa harmless. Let-aa him-aa go."

Well it turned out that the Frenchman was Cousteau and the device was the Aqua-Lung, and every time Gustav had a run-in with U.S. Divers and I was around, he would get red in the face and shout at me, "I-aa should-aa killed-aa heem-aa wheen-aa I-aa cooudd-aa!"

The third part of this article, "The History of Kirby Morgan — Part III," from the KMB-8 through to the KMB-28, will appear in the next issue.



SCUBA WORKSHOP

EDUCATION THROUGH PRESERVATION

Dedicated to the preservation and restoration of our scuba equipment heritage.

by Kent Rockwell

PROJECT TWO-b — NORTHILL REGULATOR UPDATE

(Project Dacor-Part Two will follow in the next issue.)

So·ci·e·ty *n. A group of human beings broadly distinguished from other groups by mutual interests, participation in characteristic relationships, shared institutions, and a common culture.*

The American Heritage Dictionary

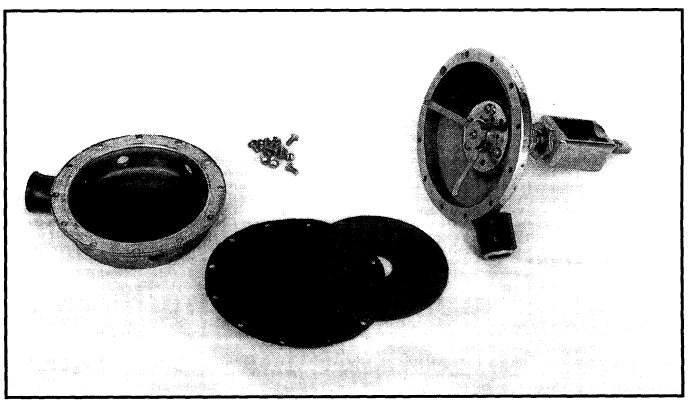
This Scuba Workshop column is successful largely due to the active participation and support of our members, who, in effect, have become much appreciated (and unpaid) research assistants.

While doing field research for our Dacor article, Jerry Powell uncovered Robert (Bob) Kimes' original patent applications and photographs for the Northill Air-Lung, (our second Workshop project *Historical Diver* No. 27). Shortly thereafter, months of fruitless investigations suddenly produced a flurry of activity on the Northill front. Florida's Ron Stem sent in clues to missing patent numbers and, through much struggle and with assistance from a very friendly Florida librarian, was able to access an important patent from its serial number. From the HDS office, Andy Lentz forwarded letters from Paul Gilday, a volunteer at Florida's Man-In-The-Sea Museum, concerning the Air-Lung. Then a chance visit with Jocko Robinson, Dive N Surf's scuba repair tech, turned up another "Holy Grail" in the form of a Northill experimental regulator. We round off these finds with a ghost contribution of a copy of *Out of Thin Air-Garrett's First 50 Years* by William Schoneberger and Robert Scholl. For this much-needed source of Garrett history, we thank the "ghost."

The Northill patent numbers #2,695,609, #2,855,923, #2,828,739 and #3,018,790, along with the elusive #2,763,262, were studied to determine the evolution of the regulator's design. Originally, only the #609 patent was found, on the Air-Lung's cover emblem, and this featured a strange and simplistic single-stage device with a single, corrugated, hose of dubious practicality. At the time of our original article we doubted that this model would have been built, much less tested; however, photographic evidence exists to the contrary. We were relieved to find the second, third and then fourth patents revealing the subsequent redesigns and the final variations of the production regulator. The last patent (#262) had been found by a reference to its serial number rather than patent number, and revealed that the mouthpiece had been patented separately as a "source selector for breathing apparatus" rather than the erroneous title of "oxygen supply breathing apparatus" found in the text of the final patent. This item is important, historically, in that all modern rebreathers use a controlling mouthpiece of similar design.

The second patent (#923) featured the characteristically (for the Northill) heavy, one piece, brass casting for the regulator body with 180-degree opposed hose spigots, a built in reserve system, a mushroom valve exhaust in the diaphragm's center and a "floating seat only" down stream single stage demand valve. The floating arrangement was chosen to compensate for the decreasing cylinder pressure throughout the dive and several charts were given indicating breathing resistance versus supply pressure. These charts indicated to us, too, that a test model had been constructed and tested at the extensive Garrett AiResearch facilities. The two corrugated hoses met at a mouthpiece tee with a rubber bit and featured no check valves. The regulator mounted to the cylinder via the typical oxygen style nut and nipple assembly tightened to a storage tank type valve.

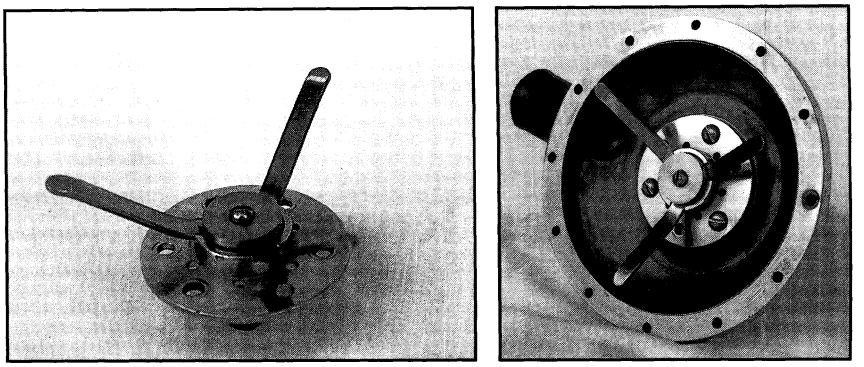
The third patent (#739) found a similar body casting to the second, a redesigned reserve system that resembled the first production version with its sheet plate actuating arm construction and a true floating downstream demand valve assembly that allowed the actuating levers to float with the valve seat. This model used the familiar yoke



Northill second experimental regulator.

and screw attachment to a cylinder post valve and retained the same mouthpiece tee from the earlier unit.

The fourth patent (#790) was really a post production item covering further modifications to the 1954 and 1955 year models and items not covered in the production model. The most noticeable change was the construction of two separate body castings that provided both lighter parts (thinner wall sections) and fewer machining operations, athough the Northill is still one of the heaviest twin hose regulators. Further modifications concerned lessons found in the field and for the 1956 models the exhaust system was changed from the centrally located mushroom valve in the diaphragm to an annular exhaust ring to allow for more complete purging of water. The sheet metal arm on the reserve was changed to an elegant casting and check valves were added to the intake and exhaust hoses. A "parts kit" was supplied to anyone with an early model and very few "unmodified" Northills exist today. The mouthpiece remained the rotating selector type featured in its own patent (#262) and furnished on all production models.

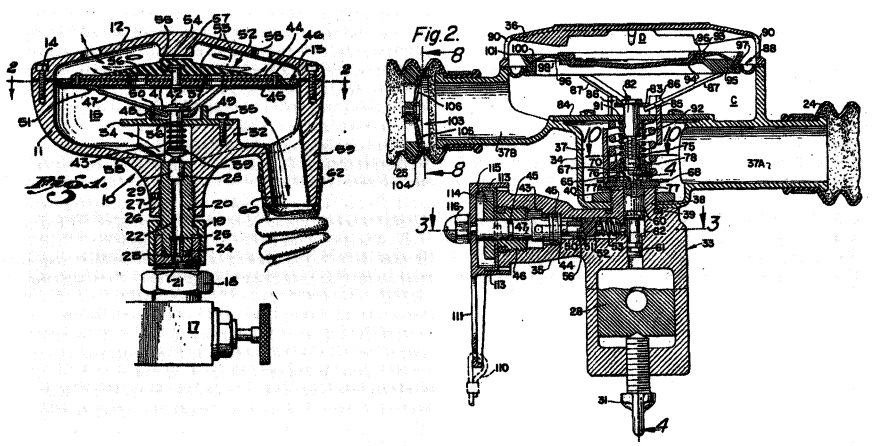


3 lever demand mechanism used in the experimental regulator.

We studied the original patent applications, paying particular attention to changes noted in pencil by Garrett's patent attorney, and then studied the photos. We were delighted to find that the original name for the Air-Lung was "Aqua-Gill." We know that inventor Bob Kimes designed fins, masks, spearguns and underwater cameras (16mm units for the Navy) and produced wooden patterns for the molds and castings. We don't know for whom he produced this tooling, but maybe we can find a connection with the name Aqua-Gill and hence discover the designer of specific pieces of historical gear?

Our second discovery came upon close examination of the disassembled Aqua-Gill regulator photos. We found the demand valve lever system to be familiar. Jocko Robinson had offered his unknown "homebuilt" regulator for close examination and inside we discovered the Aqua-Gill's demand lever system. We surmise that the single hose system didn't work as well as hoped and the demand system was removed and installed in a more conventional housing for a quick test. The body was machined from a medical regulator housing and used its oxygen yoke assembly as well. The conical valve tip was replaced on the demand valve assembly with a machined body and a nylon valve seat insert. Extra holes were drilled in the demand valve plate (the plate was spaced off the housing with small washers) to allow for air passage and the plate was spaced off of the housing with small washers. The diaphragm consisted of a .020" sheet neoprene with a phenol sheet pressure plate and the machined cover featured a plethora of fasteners and incredibly small intake and exhaust spigots. A standard early Aqua-Lung duckbill completed the assembly. We can only guess that this unit, with its small hoses and poor mechanical advantages over the stiff downstream spring, would have breathed a bit heavy. From the January 26, 1951 drawing dates we would guess this experimental model to be mid to late 1951.

Out of Thin Air proved to be a wealth of information about the Garrett companies and although the Air-Lung was only brefly mentioned, its company history and acquisitions provided a timeline of the Air-Lung's homes.



Original (l) and final (r) patent drawings.

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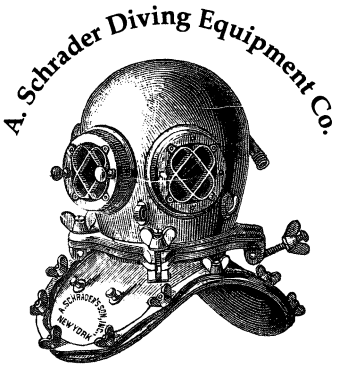

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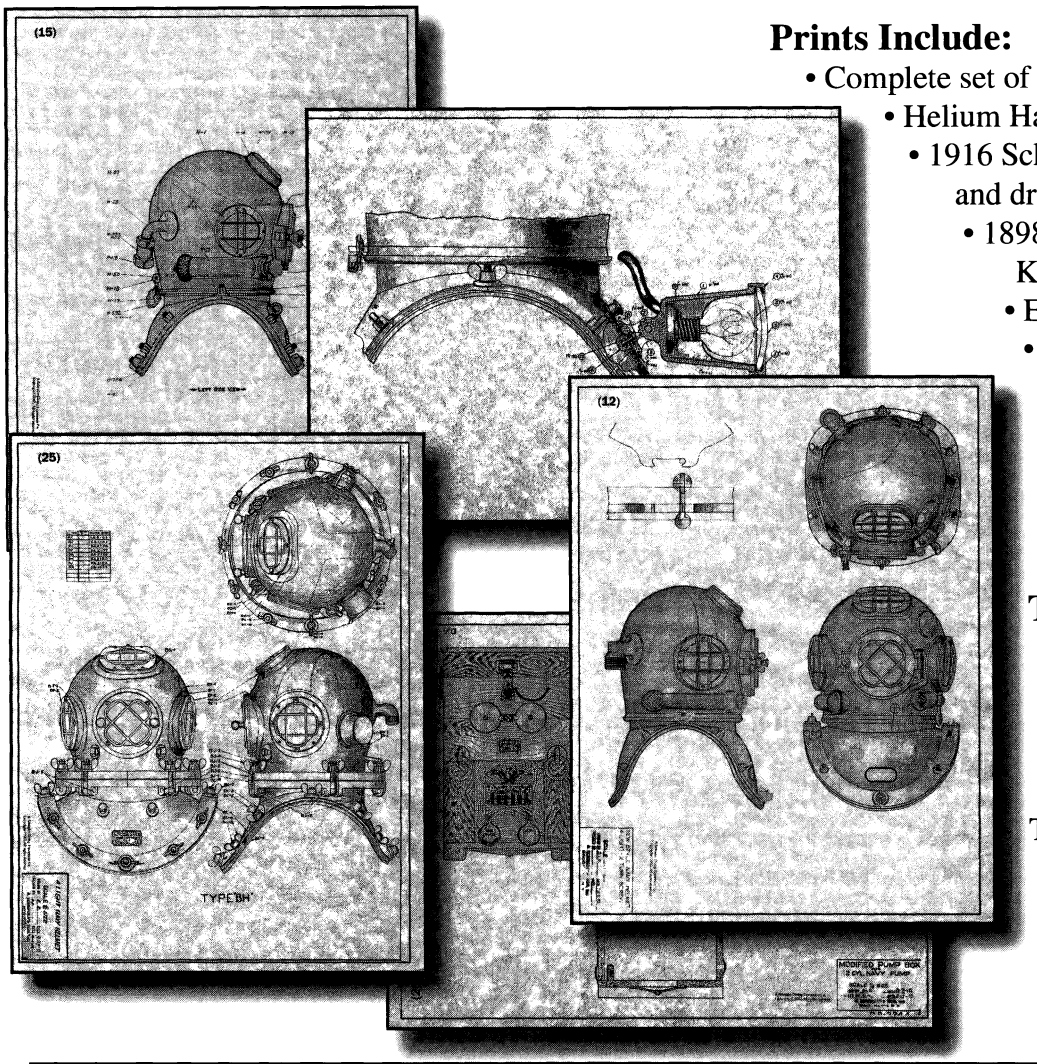

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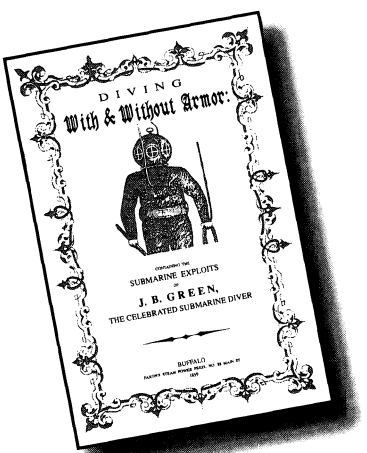

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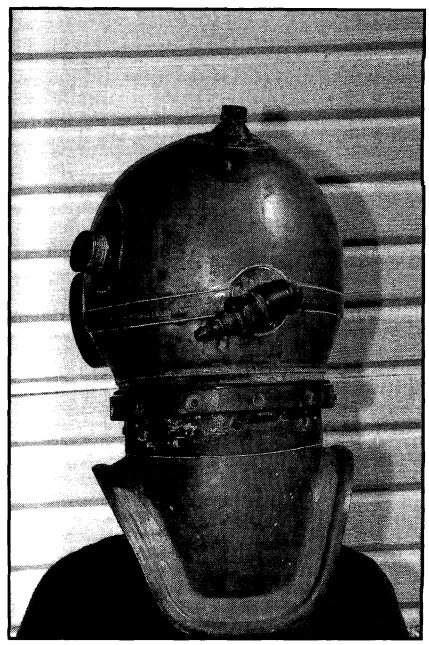
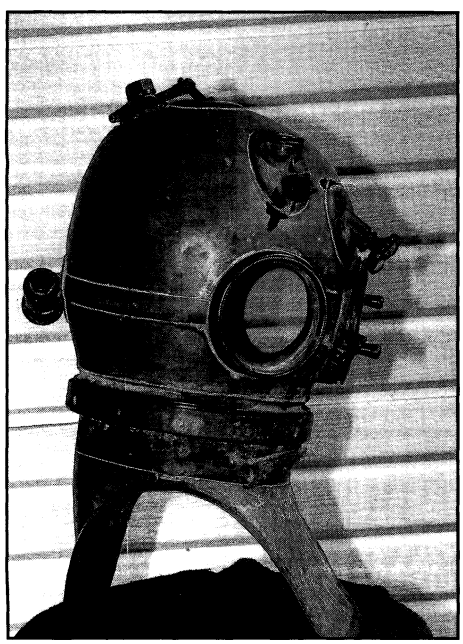
Helmets of the Deep

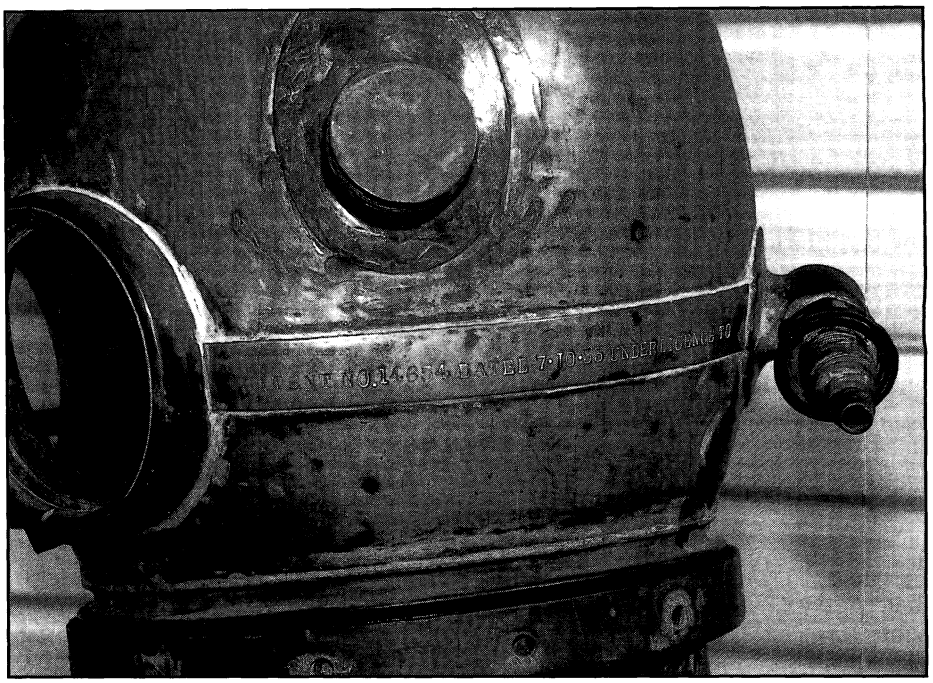
Ernest R. Clifford
Australia
circa 1920s





You do not see many of these around. This is perhaps the only known surviving example of the double helmet system patented by Ernest Reginald Clifford in Australia during the 1920s. It is a helmet-within-a-helmet and was part of an elaborate system that was known as the "Double Dress" or the "Anti-Paralysis Diving Dress." The shape of the outer bonnet would seem to owe a little to the Heinke Pearler design, which is understandable as Heinke was the principal helmet in use in the Australian pearling fields at that time. The various valves were a diver-controlled system of changing the pressure inside each of the two helmet shells. The dress attached at the neck seal. A band around

the center of the outer bonnet reads PATENT NO. 14654 DATED 7.10.33 UNDER LICENCE TO THE SUBMARINE INVENTIONS LIMITED. NO. 5



Clifford was at one time involved with John Le Noury, who members will recall was one of the "white" divers who were sent from Great Britain to Australia earlier in the 20th century to work in the pearling industry. Part of Le Noury's story can be found in John Bailey's *The White Divers of Broome*, and his last dive was in a Clifford system in 1930.

This helmet was featured in Bob Ramsay's presentation on Clifford at the HDS-USA 10th Anniversary Conference. Prior to the Conference Bob Kirby had spent some time with Ramsay attempting to figure out the operation of the valves. After Ramsay's presentation, attendees were invited to inspect the helmet and both Bobs were on hand to answer questions.

The complete content of Bob Ramsay's paper on Clifford will be published by HDS-USA in 2003.

Photos: © 2002 L. Leaney

VOICES FROM THE DEEP
By
Leslie G. Jacobs

An Interview with W. Leiter Hockett

W. Leiter Hockett has had some bad run-ins with "enthusiastic reporters." He doesn't like journalists who talk about the "murky depths." He hates grandstanding and hates being misquoted. "So much baloney has been published about diving," he said. "There's a lot more to diving than just getting underwater. The diving is but a small part of the business."

Born in Seattle in 1913, Hockett has spent the better part of thirty-nine years diving in the Pacific Northwest, although his work has also taken him to the Arctic, San Francisco Bay, Hawaii and Great Lakes.

The following is excerpted from his forthcoming book, *Thirty-Nine Years of Commercial Hard Hat Diving & a Few Other Things.* "I did many things before I started diving. I was a wooden shipwright, boat builder and metal worker before I ever dove. Many contracts eventually brought me to design DWOC — the Deep Water Observation Chamber — which I describe in detail."

December, 1949: Leiter Hockett on Snake River Bridge pier job, Pasco, Washington, with Paul Higdon tending. Hockett wears a Siebe Gorman rig. Ice on the river shut the job down.

H.D. What are your recollections of your first dive?

L.H. When I was in high school, I had read about Navy divers recovering the submarine S4 in Ellsberg's book, *On the Bottom*, and also the story of the recovery of the S.S. NIAGARA's gold off the North Island of New Zealand. I was operating my 36-foot tug CLIMAX, servicing the contractors on the first Lake Washington floating bridge to Mercer Island. A diving contractor named Colin O'Donnell hired me to shift his barge from the east shore to the navigation opening in the bridge near the east end.

I had always wanted to be a commercial diver and asked him if he would put me down sometime. He asked me to go to work for him as a deck hand while he was diving. I could shift his barge when needed. Underwater, he was spiking 4-inch by 12-inch rough timbers to wood piling, down to a depth of ten feet. They were spaced six inches apart, best described as an underwater fence.

After two days of helping him on deck, he put me down for my first dive. It was summer and while the depth was about ninety feet, his contract was for the upper ten feet, so it was not cold at the surface where the work was done. Colin had Walt, his tender, dress me in his diving dress and bolt the breastplate on as I sat on a stool. Then came the seventy pound weight belt. This was slung low around my buttocks and secured with a strap between my legs to assure the belt could not slip up. Shoulder straps held it up and it was strapped tightly around me. All this weight rested on my shoulders while out of the water. My feet had been wrapped with empty cement sacks, as chafing gear, to protect the shoes of the diving dress. They were held on with tightly bound rope-yarns.

At this stage of the dressing, it became obvious I was definitely going to sink. The air compressor was started and I was led to the ladder that was hanging over the side. They checked the telephones, then the helmet was screwed on as I adjusted my air. Two slaps on the top of the helmet by Walt meant get in the water and go to work.

I started learning to control my buoyancy, swim horizontally at will and not fall to the bottom. With practice it is possible to maintain a fixed vertical position at any depth by precise adjustment of the inlet and exhaust air

Work site, Martin Island, 1952. Cat train with steam boiler cut through ice that was five feet thick. By the time Hockett arrived to dive, the hole was 50' x 100'.

on the diving helmet. This is useful when working and is essential for controlling buoyancy. We had no staging or support on this job, and by exhausting air it is possible to sink with negative buoyancy of about forty pounds, or to carry about that much underwater weight by inflating the diving dress.

Colin taught me how to hang the rig on, control my air and let me do some work on this contract, the hardest work I ever did. Just living in the rig is miserable until you get accustomed to working in it. He taught me to dive without weighted shoes and I used rubber overshoes lashed tightly around my ankles to keep air out of them. Sometimes when working in shallow water, there were sightseers, and I would tell my tender to tell them to watch my bubbles and for him to pick up my hose as I came up. I would hold onto whatever underwater structure there was, lie on my back and raise my feet and legs. When the air got into them, I was vertical, head down with feet up. I would let go and shoot up with my feet breaking the water first. This would delight the schoolchildren. To get back into normal position, I had to shut off the inlet air, hold open the exhaust valve, lie on my stomach and double up to force my feet down to get the air back above the weight belt. I had quite an advantage because of Colin's teaching. A fish doesn't go through water vertically. You can work horizontally in swift water.

DWOC — Deep Water Observation Chamber — was designed in 1951 for depths up to 1,000 feet. I designed it to work in depths that were uneconomical for other diving equipment. The through-hull fittings were tested to 9,500 feet depth. Having been awarded the contract to make a submarine survey of a deep outfall pipeline in 1951 in Port Gardner Bay by the Soundview Pulp & Paper Co. and Weyerhaeuser Pulp Co., I elected to survey the outer portion with a DWOC. Compressed air diving was not well suited to the depth of 327 feet, and mixed gas diving was not available.

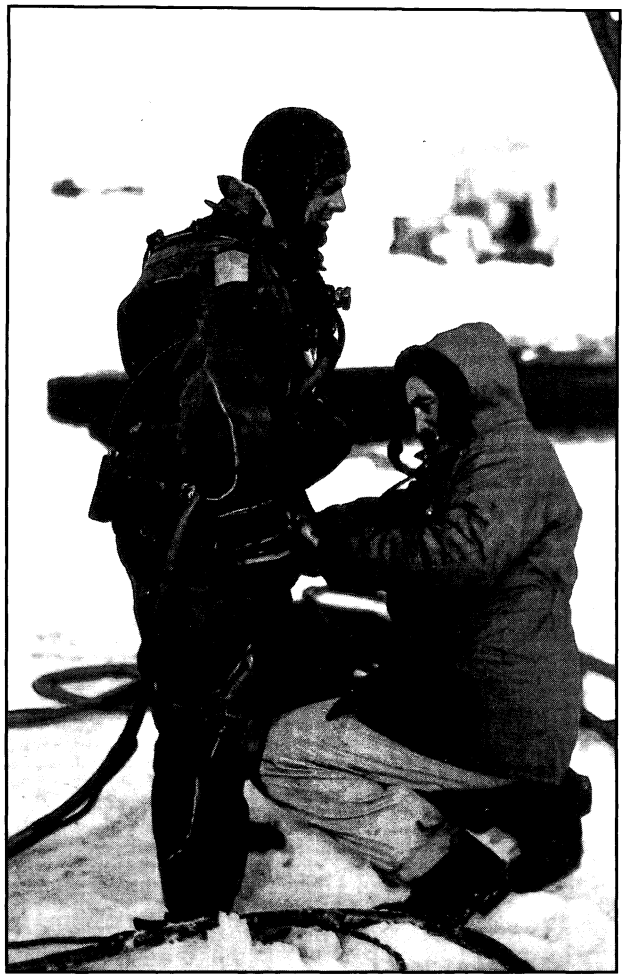
Due to the fact that no standards were established for the design and construction for vessels of this class, a design was adapted using the Boiler Code and construction was carried out in compliance with this code, as far as possible. Common sense backed up with professional engineering consultation took up where the code left off. DWOC has special lighting. In general, it can be adapted to any problem where a cable to the surface craft can be used. Used in this configuration it is similar to a large plumb-bob and permits accurate correlation of the work area on the bottom to the surface marks.

DWOC has been used many times since the initial survey of the pulp mill pipeline in 1951. It was used to locate a break and direct a deep sea diver on the outside of the chamber in 250 feet in repairing the San Juan Cable crossing to Lopez Island. It was also used in the survey of the MV CAPE DOUGLAS sunk in 666 feet of water. I examined the entire outboard hull and found no damage, as the captain had alleged.

H.D. What happened with the CAPE DOUGLAS?

L.H. In December of 1958, Capt. "Odd" John Solnordal, skipper of the CAPE DOUGLAS, said the vessel sank rapidly after striking something "very heavy, like metal," while underway, southbound for Tacoma. I read about it in the *Seattle Times*, contacted Solnordal and told him about DWOC and that I could raise the vessel. Although he appeared interested, he said not to do anything. After he received the insurance money we could see about salvaging it. He gave the position as east of Tramp Harbor in Vashon Island [in Puget Sound, south of Seattle], in about 120 fathoms.

On January 5th of 1959, I had a meeting at the offices of Capt. Lee of the U.S. Salvage Association and suggested that they select a calm day, fly over the area in a float plane and place a buoy on the oil slick. I could then go down with the DWOC to assess the alleged damage. Also, it would be necessary to determine the heading of the vessel to sweep the salvage lines under it prior to lifting.



Diving in the Arctic: Leiter Hockett and tender John Daves at Martin Island, Beaufort Sea, in May of 1952.

We loaded 800 feet of one-inch wire rope to be used as the hoisting line on the DWOC. The marking buoy put the wreck very near, if not on, the submarine telephone cable crossing to Vashon Island. Then we moved into position and set three anchors. We had over a mile of wire out on those three anchors and due to the depth the lines hung nearly straight down. On February 10th, we were ready to put the DWOC over the position of the wreck. After lunch I entered the DWOC and the lid was bolted. The entrance was a standard 11"x 14" - 450 #WP oval, boiler manhole — a tight squeeze with few clothes on. We threw heavy clothes in for a dip of any length of time. There were eight viewing ports, 4-3/4" in diameter and 1-11/16" thick, at eye level when standing up.

In the chamber I wore an aviation helmet with earphone, microphone and an oxygen demand breathing system supplied by a 122 CF cylinder. There were two screened soda-lime containers below the viewing ports on opposite sides, to absorb the carbon dioxide. Exhaled breath caused a build-up of pressure in the chamber over time. Rungs were welded between the H beam columns, 180 degrees opposite, that formed ladders to climb in and out, and I had a wood two-by-four that I could rest on the ladder rungs to sit on. There were two 1,000-watt incandescent underwater lamps with reflectors clamped on the hoist line approximately eight feet above the chamber.

As the lowering began, two men attended the communication cable and electric light cable that were taped together to form the umbilical. It was flaked out on the deck and fitted with an aluminum buoy about every hundred feet, to neutralize their weight in the water. Communication equipment consisted of amplified speakers on deck and in the winch house. A manned telephone headset was in continuous contact with me.

I was not pressurized by the sea, so the rate of lowering and hoisting was controlled at the convenience of the top crew. The DWOC dropped as fast as the crew could pay out the umbilical cables; they slowed down near the bottom. Going down as I sat on the two-by-four, the light from the surface diminished rapidly. The lights were left off to let my eyes adjust. I was soon in total darkness and watching the phosphorus swirling around in the viewing ports.

Visibility was about ten feet with the lights on, due to the reflective turbidity of the suspended solids in the water. It looked like carbon tassels, similar to the tassels that are made in the air when acetylene is burned without oxygen, only they were grey in color. There was no current on the bottom and the multitude of these tassels limited my vision. They were falling imperceptibly and settling on the vessel.

All of the movements of the DWOC were done slowly. At one point there was cause for concern because the chamber got caught in the ship's rigging. On the starboard side, in the area of the alleged damage, we set the DWOC on the bottom and laid it on its side for a closer examination at the mud line. Then rising free of the bottom, moving and lowering again, I progressed to the bow, viewing the side at the mud line. There was no sign of

damage around the bow nor aft along the port side. Even the rigging was intact.

When the CAPE DOUGLAS was raised and pumped out, a sea-cock was found open. Capt. "Odd" John was convicted of barratry and incarcerated for two years at McNeil Island Penitentiary. He was later deported to Norway.

H.D. We have some photographs of you working in snow and ice... what was that job?

L.H. Those were taken in 1952 in the Arctic, on Martin Island near Tangent Point. It is the northernmost point on the continent. The water temperature was a couple degrees above freezing and every night the water would freeze over with three-quarters of an inch of ice. What had happened was a sled with 4,000 gallons of oil in 55-gallon drums — they called them "Go-Devils" and they were very heavy sleds towed with tractors — had gone through the ice. They sent up some 12'x 30' foot timbers and we made a ramp. I went down and got the Cats hooked up so we could winch them up the ramp of timbers.

H.D. What type of helmet did you usually use?

L.H. For many years I used a Siebe-Gorman helmet. Then I had a special helmet made for underwater oxy-arc burning. This was built from scratch and screwed onto an old Mk V Navy breastplate. It was coated with quarter inch vulcanized rubber to insulate from arc welding and burning. I used that all the time. I also owned several Morse commercial helmets and they were good. The helmets I had custom-made were slightly smaller; by reducing the size of the helmet it reduced the weight and made a diver more agile.

H.D. What qualities or characteristics make a good hard-hat diver?

L.H. A diver should be a good all around mechanic and be well educated in basic physics. A good diver should not get easily excited and have a determination to get the job done properly, while putting up with personal discomfort and pressure.

The publication of this article is made possible in part by the generosity of Sea Pearls, at www. seapearls.com

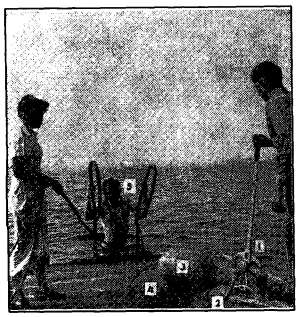
THE E.R. CROSS FILES

Shallow Water Diving and The Sport Diver Unit

In *Historical Diver* No. 10, E.R. Cross wrote an article titled "The Evolution of the Single Hose Scuba Regulator." The article covered his introduction of the Sport Diver single hose diving unit and his various modifications to it. On the last page of the article is a scan of a 1949 advertisement showing the unit with the regulator that used the original corrugated hose. It is listed as selling for $79.95. Cross noted that "There was some drag on the large diameter hose and it tended to float during the dive. By late 1949 some minor adjustments were made to both the second stage hose diameter and pressure." We recently located an undated flyer from Cross's Diver's Supply company introducing the second version of the single hose Sport Diver rig. It also promotes shallow water diving using a mixture of WWII surplus gear that was the "standard," if there was such a thing, equipment of that time. Cross recalled that he continued to modify these units and sold them through 1953, when "it became difficult and expensive to obtain tanks for my 'economy' Sport Diver." The flyer reproduced on page 63 is probably from the period 1949 - 53, and Cross had dropped the price of the unit almost 50% to $49.50.

It must be remembered that during this four-year period the Cousteau - Gagnan Aqua-Lung had been imported, and the country's main supplier was Rene's Sports in Westwood Village, just a short drive up the road from Cross's operation in Wilmington. So the foreign competition was practically on the doorstep. The images on this original flyer are not very clear so they may not have reproduced very well. No doubt a wave of finacial nostalgia will flush over some members when they see an original Sea Dive mask for $3.50, a surplus Miller Dunn hand pump for $16.50, and a new Morse pump for $40.

—Leslie Leaney



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HOSE, 1/4" Shallow Water Diving, 50 ft.	7.50
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SEPARATOR, Oil (must be adapted to Shallow Water Hose)	8.50
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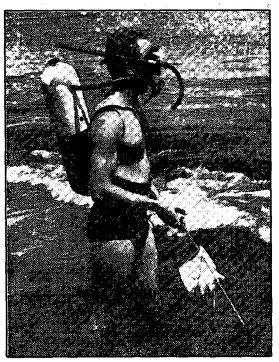
All Prices F.O.B. Wilmington, Calif.—Subject to change without notice

Send 10c now for our Deep Sea Price List, History of Diving, Divers Decompression Table & Opportunities for the commercial diver.



Sport Diver	$49.50
Sea Dive Mask	3.50
Swim Fins	7.95
Hawaiian Spear Gun, 6'	4.00
Hawaiian Spear Gun, 4'	3.50

Introducing! . . The SPORT DIVER—The NEWEST thing under the sea!

Get underwater and get the big ones with the SENSATIONAL NEW SPORT DIVER. A good swimmer can move about underwater with ease, up and down as easy as sideways. This unit enables the swimmer to remain submerged for periods up to an hour in shallow water.

The demand valve arrangement of the SPORT DIVER is the latest development in air supply regulators. Completely automatic, it provides the correct amount of air regardless of depth of the swimmer. Open the main valve on the compressed air cylinder and no further regulation of the air supply is required. This automatic feature permits the use of both hands for work or underwater sports.

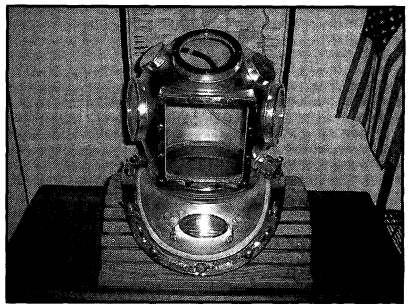
The SPORT DIVER offers the advantages of the more expensive units imported from Italy and France without the extra cost imposed on imported goods.

Designed for sport divers by men with years of experience in underwater work, the SPORT DIVER is reported to be the most comfortable unit available for underwater swimming. It is ideal as an emergency unit for lifeguards, police and fire departments; emergency repairs to boats, docks and other marine installations; and is excellent for use of marine biology classes.

Priced for The Sportsman—Just $49.50.

Classic Diving Equipment Groups

Due to the prevailing liability laws in America the HDSUSA does not conduct any in-water activities. Some American based divers have formed groups to restore, operate and preserve the classic equipment of America's rich diving heritage. These groups often contain divers who are members of the HDSUSA. The activities of these groups are not official HDSUSA functions and the HDSUSA is not involved in any of the activities of these groups, a sad situation that the HDSUSA is forced to endure. This column is produced solely for the interest of our readers. Please consult the HDSUSA disclaimer at the front of this issue.



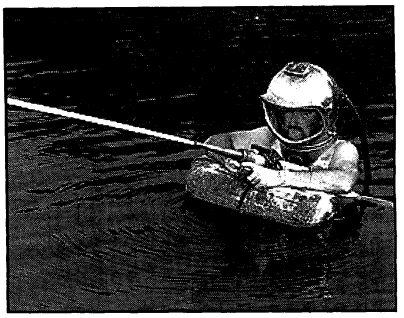
MOAV, has been a bunch of very busy beavers. In October MOAVBilly went to Palau for a week, on the way back to the USA he decided (at the airport in Guam) to meet up with and surprise the heck out of the other 16 members arriving in Guam on their way to Truk Lagoon, so we all ended up in Truk, 16 of us on the ODYSSEY and MOAVBilly on the TRUK AGGRESSOR; the vessels passed each other on a couple of occasions and moons were promptly exchanged. The diving was outstanding: we made 23 dives on 18 different wrecks, most of which had been originally located by Jacques Cousteau in the 1960's. Now for the helmet business, after two thorough readings of *The California Abalone Industry* by A.L. "Scrap" Lundy, MOAVRuss became fixated on the square face plate Abalone helmets on pages 128, 133, and 147. So as a tribute to the Abaone divers the "Potocki II" was conceived. The helmet has a DESCO Sponge top and breastplate, a square shallow water front window without the guard, Agar top and side lights, telephone cup & air diffuser, Quintner control valve, 3 ball air control handle, Agar rear head butt exhaust, 4 wire comms., breastplate posts, loops on brailes, Browne commercial block with an O2 fitting and tin plated. While all this sounds very nice, MOAVRuss wisely had the professionals at DESCO take the concept and make it into a fantastic diving helmet. The crew at DESCO did an outstanding job of making the helmet a reality. Special thanks to Mr. Bob Kirby; although without his knowledge, his influence is very evident in the design. Sometimes you just can't improve on perfection. The "Potocki II" is only available through DESCO.

CALIFORNIA CLASSIC EQUIPMENT DIVERS. A Rally was held August 10 at the College of Oceaneering in Wilmington. A lot of new gear was tried out including a beautiful new Galeazzi Gran Luce. Also underwater for the first time was Jocko Robinson's new Chinese TF-12-Y-4 known as the "Firehouse Special." The modifications for the helmet's design came about at a workshop held at a local firehouse. Robinson also tried out his new handmade rebreather and Kent Rockwell (aka Rocky) tested two Navy designed double-hose regulators. We were pleased to have Leslie Leaney spend the afternoon and with the assistance of his stepson David Goulard, dive the new Galeazzi. Afterward everyone met at the Acapulco Restaurant in San Pedro for a little R&R.

The 4th Annual Dive Demonstration at the L.A. Maritime Museum was held August 31. Diving continued throughout the day using a variety of helmets including the Desco-Kirby. Visitors also had the opportunity to enjoy the Museum's newest exhibit, "20,000 Jobs Under the Sea."

The bimonthly meetings are being modified to include specialized workshops. Harold Nething, retired U.S. Navy UDT, will start off by teaching a class on knot tying. Other workshops are being planned to include helmet modification and demonstrations of emergency procedures while underwater, such as using the bailout bottle.

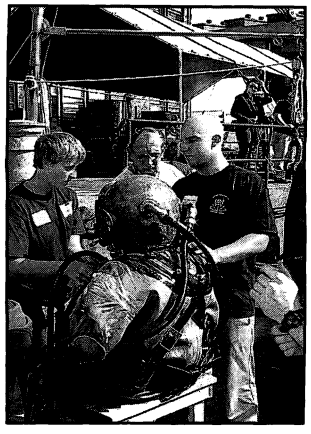
DUTCH WORKING EQUIPMENT GROUP GOES TERSCHELLING! Last September, our group was invited by Diveteam Ecuador to come over to the island of Terschelling and perform some serious diving demonstrations. We took our MkV and Dutch Diving Helmet #1 to show these scuba divers what real diving is like! Air was supplied by a 1898 three cylinder Heinke pump! This pump was also used many times in the salvage operations of the LUTINE. This ship sank in a storm near the coast of Terschelling in 1799 and is still there, loaded with gold and silver. Even Edmund Halley and the Deane brothers came round in the past to try and salvage the cargo! We had many spectators to show what our passion is all about and had a great stay at the Wreck Museum that holds a lot of interesting diving equipment and items brought up from shipwrecks by diveteam Equador.



BRASS HAT DIVER has had a busy summer. We were honored to be asked to give dive demonstrations in America's oldest Oceanarium, "Marineland of Florida." It was a pleasure working with Leon Lyons at this event, and watching him dive his 150+ year old Augustus Siebe helmet. Other helmets included Robert Weather's Morse MK V and type 15 shallow water helmet along with John Gallagan's Miller Dunn Style 3 Divinhood. It was this style of helmet that was used extensively at Marineland of Florida during its heyday. Next up we worked with the Treasure Coast WEG to perform a dress in of heavy gear and helmet diving 101 for the South Florida Scuba Diving Club of Hollywood. This was a very entertaining and educational presentation and much fun was had by all. Our last event was the Grand Opening of Reef Raiders Bar and Seafood Grill in the lower Keys. Diving was done with the old style Morse hand pump and helmet, and the public had a great photo opportunity to see vintage dive gear at work. After each dive the diver brought up a handfull of Maine lobsters (rare in Florida waters) to be cooked in the large outdoor grill area. We all agreed this is what diving is all about: fresh seafood at its best.

Joe Grace of Broward County Fire Rescue is looking for information on underwater fire fighting and dive rescue from the 1920s and 1930s in hopes to give a demonstration in Port Everglades, Florida, in the upcoming year. Any information would be of great help. Our e-mail address: info@brasshatdiver.com. For more information about the Brass Hat Diver check out our web page: http://www.brasshatdiver.com

UHEXSO has begun planning for next 2003. We have two events currently scheduled. One is a local gear check-out dive in the Houston area tentatively scheduled for the third weekend in January. The second is our annual dive rally in Lake Travis, near Austin, Texas, scheduled for March 22-23, 2003. For details, contact Paul Schenk at diverpawl@aol.com. http://www.geocities.com/uhexso



NEDEG. It was a very busy summer for the Northeast Diving Equipment Group, beginning with a week of outdoor demos in the FantaSea tank at the Middlesex County (N.J.) Fair, from August 5 through 11. On August 24-25 we returned to the Seafood Festival at the Long Island Maritime Museum, at West Sayville, and dived all sorts of gear off the adjacent dock. The 9th Annual Labor Day Working Equipment Rally took place at Willow Springs Quarry Park at Richland, Pa., on August 31-September 2. We had a great time in spite of threatening weather. Visitors included David Tidmarsh from England, who dived everything from Bob Rusnak's Scott HydroPak to the full MkV and Mk12 rigs. (David returned to the UK and dived a Siebe-Gorman rig two weeks later!) Eighteen-year-old Russ Miller from Annapolis, Maryland, who had dived his first MkV on Memorial Day, returned with his father, Cdr. Ed Miller USN (ret.), a veteran MkV diver, and we dived the father-and-son team together in matching MkV's. On the last beautiful summer day of the year, October 5, we put on MkV demos at the Divers Academy International in Camden, N.J., for their 25th Anniversary celebration. We got Mark Butler's and Steve Sokoloff's MkV rigs online and dived more than a dozen academy alumni, students and guests, who won dives in a raffle. Bob Rusnak and Jerry Takacs set up an HDS display topside.

Diver is HDS member Marc Cohen. Photo by Mark Tohulka

TREASURE COAST WORKING EQUIPMENT GROUP. We has had an active summer and fall with members Mike Russo and Bob Weathers diving Bob's new Morse MARK-V in the aquarium in St. Augustine, Florida. They even got a full-page spread in the local newspaper up there. On September 4, Marc Cohen, along with Mike Russo and John Gallagan, did a presentation at the monthly meeting of the South Florida Divers Scuba Club (http://www.sfdi.com). Mike dressed into Marc's 1933 Morse 4-light commercial helmet, Converse dress, and weight belt and boots. We even inflated the dress from a scuba bottle hook-up much to the delight of the crowd and with almost no complaining from Mike. Unfortunately, our November 9-10 annual rally in Key Largo, Florida had to be postponed until November 30 —December 1. Fellow member Rick Ford, who runs the Jules Undersea Lodge, where we hold our rallies, had to fly to Indiana on short notice. The rally will be sponsored by Morse Diving (www.morsediving.com) and owner/manager Ken Downey has given us some goodies to give away at this popular event. Gina Silvestri of the U.S.S. HOGA (YT-146) Association is that much closer to bringing this historic navy tug-boat, the only vessel still afloat from the Pearl Harbor attack, to Hollywood, Florida as a permanent floating memorial/museum, and we look forward to doing diving demonstrations for public viewing in our WWII era diving helmets and suits.

The 13th annual Nautical Flea Market in Pompano Beach, Florida was the weekend of November 16-17 and several of our members were seen browsing around for equipment. I scored a Morse breastplate (#3221) for my collection. Anybody out there have the bonnet?

For details of regional rallies, meetings, etc. contact the following groups:

The Undersea Heritage & Exploration Society. A Non-Profit Corporation. John F. Hoover, Executive Director. Phone 512-288-7067 www.uhexso.org

New Jersey. Northeast Diving Equipment Group. Jim Boyd, organizer. Phone 973-948-5618, www.geocities.com/boyddiver

Colorado Working Equipment Group. Contact Ross Boxlitner, Phone (970) 278-0738 email: dypcdyvr@cs.com

Chicago, Midwest Working Equipment Group. Gregg Platt, organizer. Phone 874-854-7154

California Classic Equipment Divers. Charlie Orr, organizer. Phone 320-834-7051 www.geocities.com/cced_barstad

Florida's Treasure Coast. Marc Cohen 954-565-9754.

California Central Coast Working Equipment Group. Scrap Lundy, organizer. Phone 805-963-4151

MOAV South East Texas. A Non-Profit Corporation. Bill Gronvold, Phone 281-861-6478 or moavbilly@moav.net

New England Underwater Working Equipment Group. Paul Harling organizer. 551 Washington Street, Gloucester, MA 19030

Dutch Working Equipment Group. Kees de Jonge at helmduiken@chello.nl or Bert Dodde at info@divingheritage.com

Brass Hat Divers. www.brasshatdiver.com

www.hds.org
by Russell Potocki

The squeaking wheel doesn't always get the grease. Sometimes it gets replaced.

-Vic Gold

Replaced is exactly what has been done with our server. We have been up and running since the last quarter on our new Apache server and have experienced zero down time. The statistics for the last 4 months are impressive indeed: we have had 647,816 hits, which equates to an average of 161,954 hits per month. Since the last column we have added a section on Lloyd Scott, the gentleman who ran the London and New York city marathons in heavy gear. We have also added a section in memory of Philippe Tailliez (1905-2002) and another in memory of Commander Doug Fane (1909-2002). Please visit www.hds.org to learn about these great men; you will find links on the front page. For anyone who is curious to see if they are the proud new owner of a brand new U.S.N. MKV or other wonderful diving paraphernalia, the 2002 HDS-USA Fund Raiser winners' names are posted at the top of the front page. Should you have any questions, comments or suggestions, please feel free to contact me at moavruss@moav.net

INTERNET AUCTIONS

Internet auctions and sales during recent months. Prices are rounded to the next highest dollar. The content of this column is provided in good faith by members for general interest and is not a definitive guide. Vendors' opinions of what items are, and what condition is, are not consistent. The HDS-USA and HDM are not responsible for any errors in descriptions, listings and prices. Items that Failed To Meet their Reserve (FTMR) have their highest bids *listed.*

HELMETS

America

Advance Marine "Swindell." Looked complete. $715

Advance Marine "Swindell." Gas hat with back pack. FTMR. $1,925

Desco 4 light commercial dated 1953. Most of original tinning in tact. $3200

Miller 200, #253E. Looked complete. $2,300

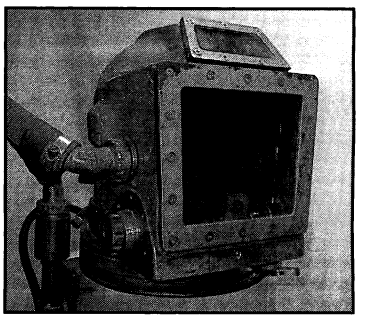
Miller Dunn Divinhood style 3. Stripped to copper and brass. New glass, with weights. $3,900

Miller Dunn Mark V breastplate only. Damage to tag. Missing straps, nuts, and one stud. $751

Morse Mark V #2683, dated 8-18-18. Black resin coating over the bonnet. $6,988

Morse Mark V mismatch. Breastplate # 532, dated 11/44. Unfinished front port conversion. Missing comms and air inlet elbows, locking device, straps, nuts. $2,113

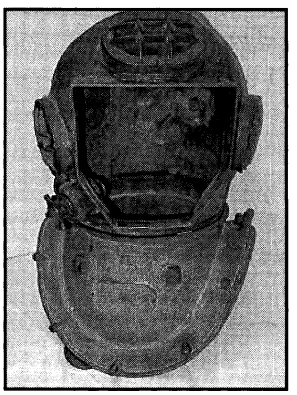
Morse shallow water #5901, stated as sold on February 2, 1945. No weights. Very good condition. $3,950



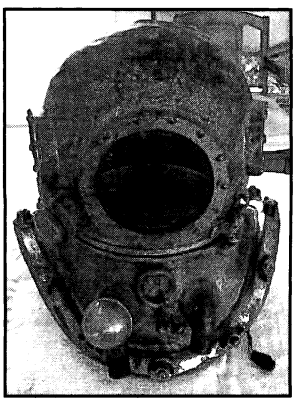
Advanced Marine Gas hat.

(Appeared to be) Schrader Mk V, missing tag, top and front port guards. Located in Chile. $4,000

Zimmerman-Divine, Oregon 3 light bonnet on converted Morse breastplate #1530. Comms and air inlet connections on front of breastplate. Damage to port glasses. $3,730



Morse MkV



Zimmerman-Divine

Chile

12 bolt Octopus bonnet. Very clean. $1,200

12 bolt, round side lights, with possibly a Siebe Gorman air inlet elbow. Very clean. $1,445

Italy

Galeazzi breastplate #33.451 with Chilean 3 light bonnet. Located in Chile. FTMR $2,185

Russian

3 bolt helium. Located in Sweden. FTMR $1,300

3 Bolt commercial, matched rings #1785. Located in Russia. $811

3 Bolt, bonnet only #2712. $530

United Kingdom

Barnett & Foster, London N. 3 light. Judging from the photos it appeared nothing on the bonnet was original. Heavily repaired/reconstructed. Some members felt that the tag might be the only original piece remaining of the helmet. Located in Chile. $3,975

Chilean Galeazzi

Heinke Pearler. Stated date 1908. Salvaged from a sunken pearling lugger in Bathurst Bay, Australia. Missing several parts. Located in Australia. $4,000

Siebe Gorman & Co. Ltd., 3 light hand formed bonnet, straps stamped 6855 on underside. Missing several parts including comms elbow. Poor condition. Located in Chile. $2,350

Siebe Gorman & Co. Ltd., 3 light. No tag, no face plate knobs, modified side light guards. With T wrench. Located in Chile. $2,500

Siebe Gorman & Co. Ltd., 3 light. Matched #17839. No tag. Missing part of air channels. Polished. $3,350

Barnett & Foster Helmet and tag.

BOOKS

1915 USN Deep Diving Tests. Slight damage. $714

Deep Diving & Submarine Operations. 6th edition. No d.j. Damaged. $104
1925 Morse catalog. $565

KNIVES & PUMPS
Morse #15 pump #1026, complete with original handle. $1,026
Siebe Gorman 175th Anniversary knives. Matched pair #126. $601
Siebe Gorman 175th Anniversary knives. Matched pair #133. $632

SCUBA
Scott Hydro pack, single tank, mask, back pack and regulator. $1,200
US Divers Royal Mistral, red tag #1415. $788

UK Heinke Pearler

MASKS, REGULATORS
Dec, 18, 2002: **Australian Porpoise** $102, $51: **Dacor** C-3 $52, Dart $137, Early Diving Lung $300: **Divair** C model $1027: Desco Mask $325: **Healthways** 1957 Scuba $149, $109, (1960) Deluxe $99, $101, (1962) Deluxe $255 w/box, $143 w/box, (1961) Scubair $31: Momsen Lung $766: **Nemrod** Snark III Silver $228, $159, Snark III early $290, Snark II $32, $89, $35: **Northill** $187: **Regulator Repair Manuals** $561: **Scott Hydro-Pak** $1,045, mask & regulator $200, $1200, $225: **Siebe Gorman** Merlin $283: **U.S. Diver** Calypso $77, Conshelf VI $50, DA $263, $305, $245, $156, DA non-mag $686, DW Mistral $162, $125: DW Stream Air $175, DX $211, $260: **Mistral** w/ Tripple Tanks $1025: **Royal** AquaMaster $405, Jet Air $123, $67, $102, $155: **Voit** Triest j $227, 40 Fathom $55, VR-1 $330, VR-2 $661, $431, Dolphin II $143, Navy $144, V22 w/box $460, 50 Fathom $159:

INFORMATION WANTED

NORTH SEA DIVERS - A REQUIEM. - UK

I have just had published a book, above, in tribute to the 58 commercial divers who lost their lives in the North Sea between 1970 and 2000. Some of these were Americans, of course, and I am trying to solicit information on the divers' deaths from friends, relatives, and work colleagues to enable me to go forward and produce the definitive version of all events. What money I have made from the books has gone back into reprints as information has come in, and I would be very grateful if you could give some publicity to these men whom, I believe, were an essential part of North Sea oil and gas history. The book is entered in the British Public Library for historical reference. The first chapter can be read on my web-page www.northseadivers.co.uk, which will lead an interested person to the publisher from whom copies may be obtained. The book is also available through Amazon. I am an ex-pro myself and worked years ago with the likes of Jay Jones, Charlie Coggeshall, Stan Dyket, Warren Ryder, Louis Giacona, Jim McDole, mostly Taylor Diving guys, and many, many other American divers. Good days, and good guys! I'm a pensioner now, 67 come February, and remember them all with pleasure. I do hope you can get some interest worked up. My very best regards,

Jim Limbrick at jim.limbrick@btinternet.com

CRIP STEVENS - LOUISIANA, USA

I am the son-in-law to the commercial deep sea diving legend "Crip Stevens" of Franklin, LA, who recently passed away. I am seeking individuals who knew Crip and who may assist with diving stories about him, as his daughter and I intend to author a book about his life and adventures. I can be reached at, Roland Duquette, 21202 Olean Blvd., Suite E-3, Port Charlotte, FL 33952
Roland Duquette at rsduquette@hotmail.com

GENERAL AQUADYNE — FRANCE

I'm a French commercial diver and a member of HDS U.S.A. I am collecting old diving regs and professional band-masks and would like to receive any information about the U.S. brand "General Aquadyne." I already own a DM5 band-mask and I need some information to make my web site. Any help would be greatly appreciated.

Eric Souverville at Eric.Souverville@wanadoo.fr

MARK V MINIATURES — ITALY

About one year ago I introduced my Italian miniature helmet. Fortunately I have found many impassioned friends of historical scuba diver and I now start to also make Siebe Gorman miniature helmets. I wish to study the American helmets, and I would like to receive information such as drawings of the Mark V helmet with specific measurements. I am a member of the H.D.S. Italy, but I have not succeeded in finding these drawing with the measurements. Can any members help me? I will pay all the expenses incurred in providing drawings and I invite members to visit my web site at http: //spazioweb.inwind.it/masuccisub. I had started this miniature adventure for fun, but now it seems that it has become something very interesting.

Maurizio at masuccisub@inwind.it

DRAGER — ARGENTINA

I am from Argentina and I recently bought a Dräger Duomat dive regulator in a very good condition. I am looking for information about this regulator. Can any members help please?

Juan Ignacio at jhpini@interprov.com

SKIN DIVER MAGAZINES — SPORTSWAYS INC.

I would like to find out if there are any members in Florida who have an SDM collection with issues prior to 1960. My interest is in historical research into the early business history of Sportsways Inc. From the intial inquiries, I have found that its creation as a business entity was in the August 1958 time frame. Any information from members is greatly appreciated.

Ronald L. Stem
5902 S. Switzer Ave.
Tampa, FL 33611

MARK V ACCESSORIES WANTED

I was a hard-hat diver in the U.S. Army in 1954-55 and upon discharge I obtained a salvage Mark V helmet and breastplate. I have donated those to the Vermilion County War Museum in Danville, Illinois (my hometown), and am now seeking the necessary accessories to assemble a complete diver for their display. I need assistance in locating donations for a dress, weighted belt, shoes, and knife to do this project. None of the items need to be new, usable or of any value. All help would be greatly appreciated. The museum contact is: Harold "Sparky" Songer, Curator, Vermilion County War Museum, 307 N. Vermilion, Danville, IL 61384-0193. Phone 217/431-0034. Fax 217/431-5393 E-mail vercountywarmuseum@yahoo.com.Thank you in advance for your assistance.

A. J. Geis, Chapel Hill
North Carolina.
ajgeis@att.net

Ye Olde Master Diver's Locker

Being a visual accounting of some of the weird and wonderful diving gear evaluated by the U.S. Navy
Compiled and written by L. Tracy Robinette

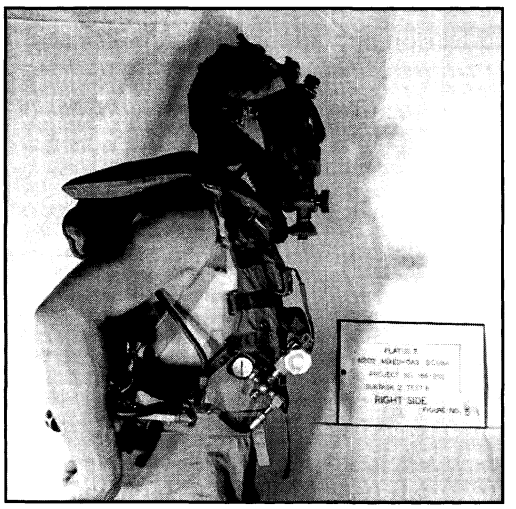
Flatus 2
N202 Mixed-gas Scuba

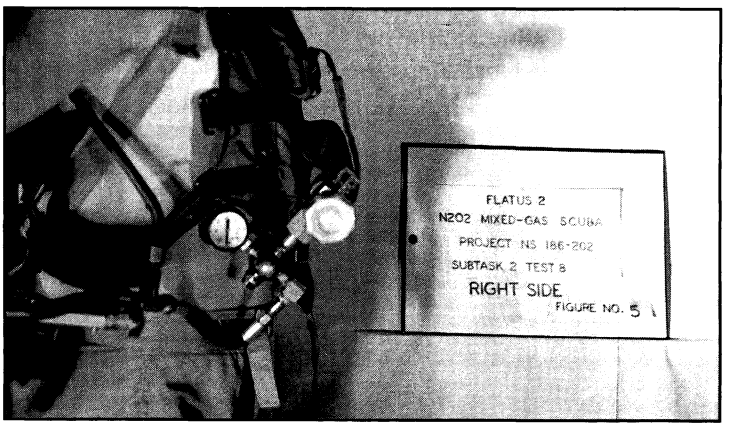
The Flatus II was built by Emerson from a modified Lambertsen Amphibious Respiratory Unit (oxygen only closed circuit rebreather) circa 1952. It was a recirculator style rebreather comparable to the previous pendulum style of rebreather that was popular in WWII. The rig was equipped with a constant mass flow regulator and sonic orifice which is the same basic type of system used today on rigs such as the Dräger Dolphin, Atlantis and others. Twin counterlungs encircle the back of the diver's neck, separating inhalation and exhalation, and then feed through short corrugated hoses into a full-face mask with a built in shutoff and over pressure valve.

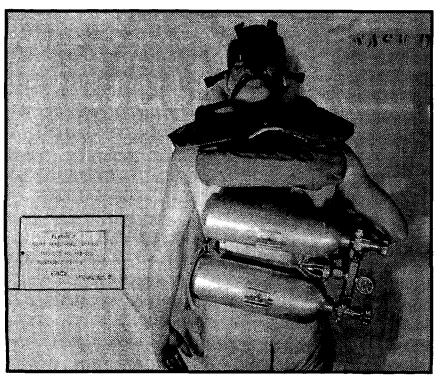
The Flatus II was fitted with a small front mounted vertical canister and twin cylinders mounted on the diver's back. These were filled with various mixtures of what we now call Nitrox — a mixture of nitrogen and oxygen. Some of the pressure gauges and other components that are shown on the rig are there strictly for evaluation and measurement during testing. They were not for operational use.

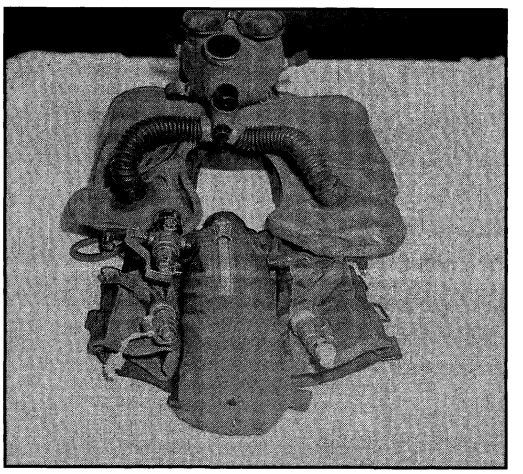
This rig ended up being used strictly as a test bed for various ideas that were included on later equipment. It is another in a long line of rebreathers used to enhance our knowledge leading up to modern day rebreathers.

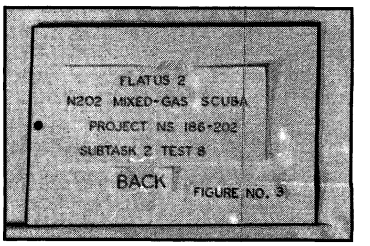
If any of you have any further information on this, please let us know, so that we can update this in a later issue. I can be reached at ltrobin@divenet.com or through the HDS.











James L. ("Jiggs") Jackson
1930 — 2002

James L. ("Jiggs") Jackson, 71, died of heart failure September 28, 2002, in Wasilla, Alaska. He was born in Oklahoma City, December 17, 1930 of Choctaw heritage. In 1956 he moved to California and joined the Pilediver's Bridge, Wharf and Diver's Union in Wilmington, California, doing heavy construction on bridges and piers. He then went to work for Richfield Oil Company on a man-made island a half mile offshore at Ventura, California. Jiggs pursed a career in construction diving through the union and worked around harbors in Los Angeles, Long Beach, San Diego and Santa Barbara. In 1959 he started working for a diving firm in Santa Barbara servicing the offshore drilling industry, diving to 250 feet on air and making "several air dives to 305 feet." Jiggs helped form Div-Con and started diving mixed gas.

He relocated to Alaska around 1965 and serviced the oil drilling ships in the Cook Inlet. Here he encountered extreme conditions. "This is a very treacherous body of water in which to work. It has high tides of 30 feet and we could only work during slack water. There was no visibility."

In Alaska Jiggs formed Aquatic Divers, installing two platforms, repairing pipelines, stabilizing pipelines and spooling up pipelines to the pipeline manifold for Shell Oil Company. He moved back to California, working in the Sacramento River laying more pipelines. "These were big 10 foot ID (inside diameter.) Then I went to Kuwait in Saudi Arabia to supervise the installation of four liquefied natural gas (LNG) pipelines. I thought I went over just to supervise, but as it turned out, the divers that were supposed to be divers were only beginners, so I had two jobs; I taught divers and installed the pipelines. These sections of pipe were 18 feet long and 10 foot ID and weighed about 7 tons each. I finally got one person broke in good enough to dive and to lay a pipe and was to the end of my contract, so I came back to the United States."

Moving back to Alaska, he sold Aquatic Divers and was awarded an inspection contract for the City of San Francisco to consult and run an inspection crew of divers on the Clean Water Program at the Ocean Beach Outfall. He formed JAB (Jackson, Allied, Barnes) and was on this inspection job for 5 years. His sons, James Jr. and Dave, both worked with Jiggs on this job in San Francisco. Next came a two-year contract with Morrison Knudsen in Newport News, Virginia running divers on the James River Tunnel Project. "The job was to install double-barreled tubes, which were 325 feet long, 80 feet wide and 40 feet high. These were installed in a ditch that was 50 feet under the James River, for traffic. There were 15 sections and it would handle traffic going in opposite directions from Newport News." His last diving job was on another underwater tunnel in Boston. "The tunnel went under the Boston Harbor to relieve commercial traffic around Logan Airport that had become a mess. This was in '92, '93 and '94. When I finished that job, with long hours and no time off and very little time with my family, I decided to retire." Jiggs continued as a consultant to various diving and construction companies and settled in Alaska.

Edited in part from text written by Jiggs Jackson in 2000, courtesy of Don Williams. References to Jiggs career can be found in the book, 20,000 Jobs Under the Sea, *by Torrance Parker.*

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Art of the Underwater World

This underwater image comes from a late 19th century German book. The editors think it may have been painted by Eugen von Ransonnet-Villez, as it looks similar to his work at Tor. (*Historical Diver* Magazine Vol. 9 Issue 3, page 42) Members with any information on this image are requested to contact the editors.

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